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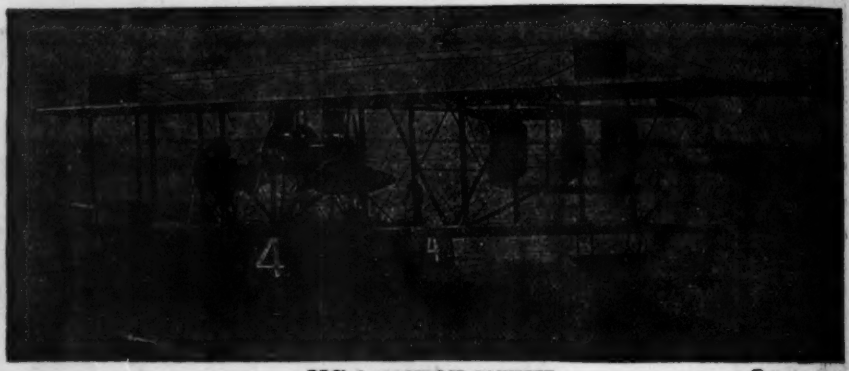

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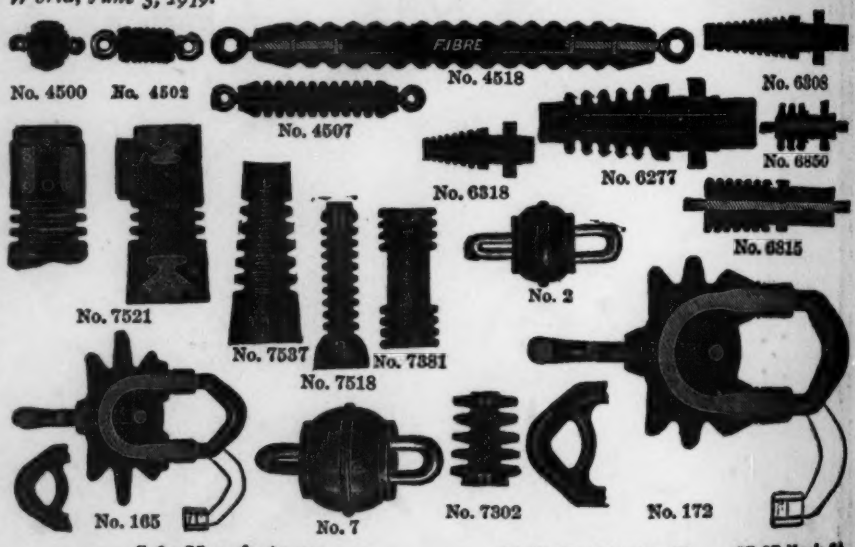

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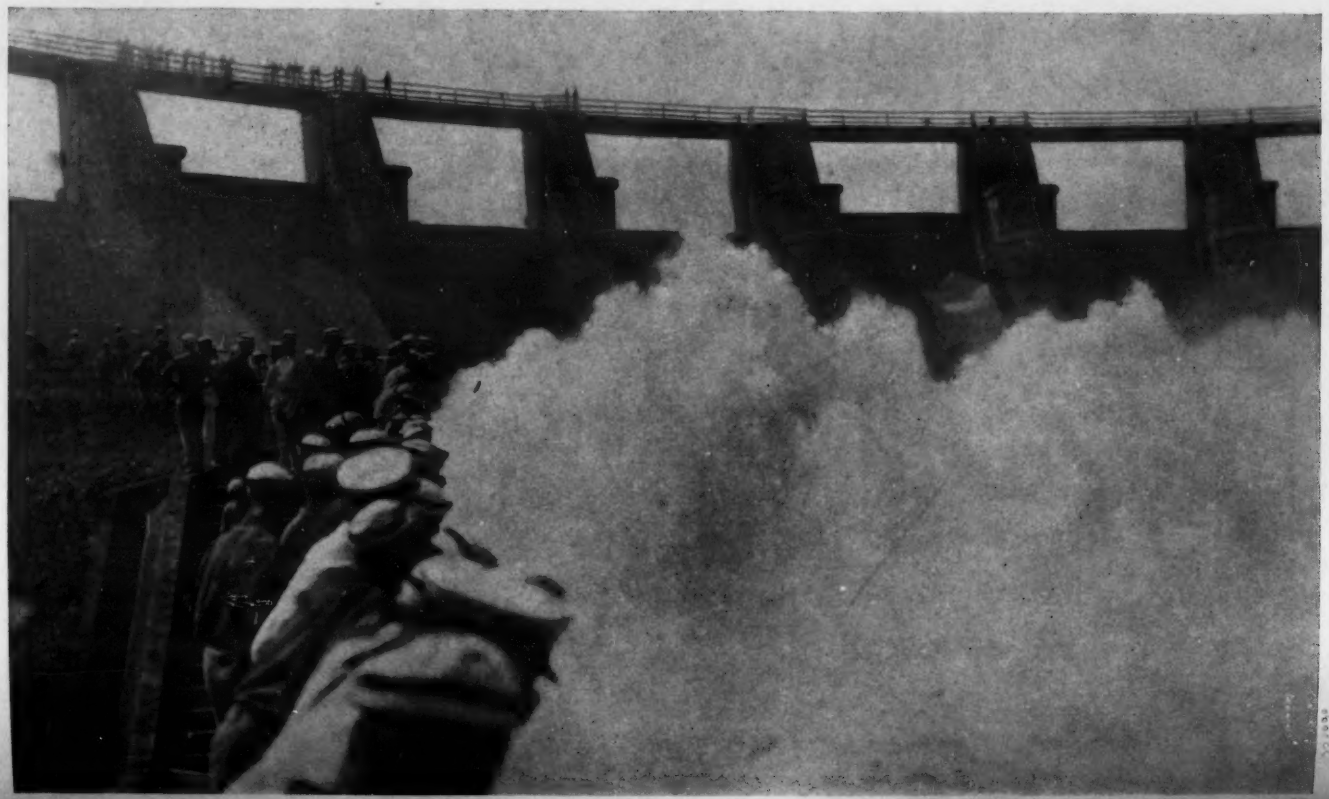

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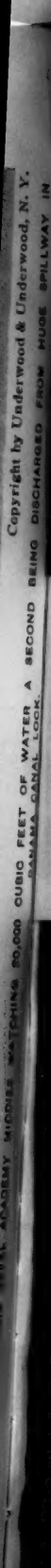
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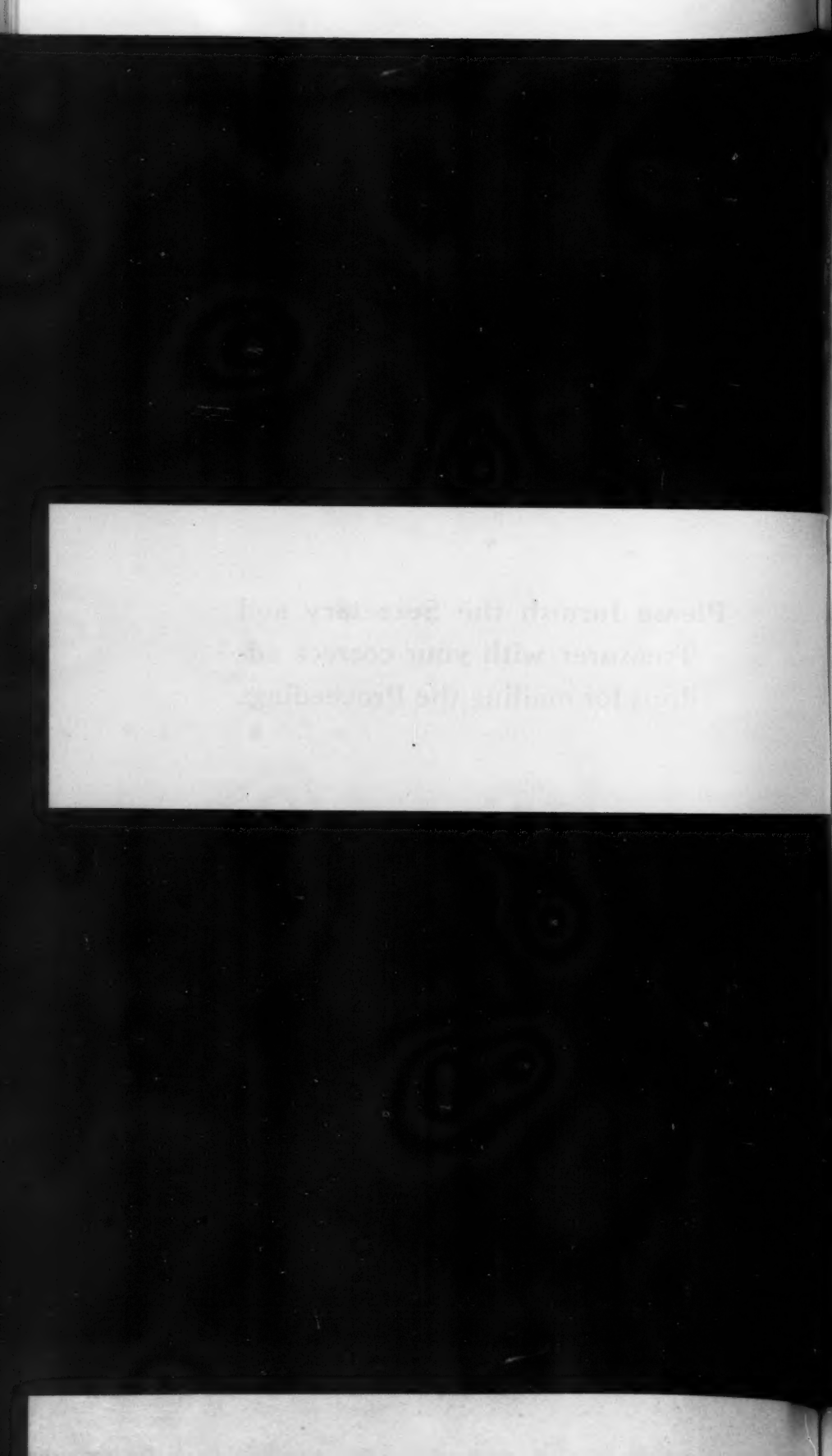

UNITED STATES
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Vol. 45, No. 11 NOVEMBER, 1919 Whole No. 201

A DESCRIPTION OF THE BATTLE OF JUTLAND

By Lieut. Commander Holloway H. Frost, U. S. Navy

Motto:

"Indoctrination makes effective co-ordination possible.
Effective co-ordination makes concentration possible.
Effective concentration combined with the spirit of
the offensive makes victory probable."
—Captain C. T. Vogelgesang, U. S. Navy.

I. Introduction

Numerous accounts of the Battle of Jutland have been published from British sources. Admiral Jellicoe's book, "The Grand Fleet, 1914-1916," presents a detailed description of the battle from the viewpoint of the commander-in-chief of the British forces engaged and gives the reasons for the various moves made by the British throughout the action. This volume also contains the complete official report of the battle which was published in deleted form soon after it was fought. While Admiral Jellicoe's description of the night action is the most complete thus far published, further information on this interesting phase of the battle is very desirable. A special effort has been made in this paper to reconstruct the details of this action from the incomplete information available.

The German official accounts of the battle have been contradictory, unreliable and generally unsatisfactory. This was doubtless due partly to the difficulty of determining what actually took place in a battle fought in misty weather and partly to misstatements made for propaganda purposes. The unofficial accounts of the battle are merely enlargements of the official accounts. Only a few details can be gained from the German accounts and consequently the movements of the German forces during the day, not to speak of the night, are very uncertain at some stages.

It will be noted that numerous sketches have been used. All the information available has been incorporated in them and every effort has been made to make them as accurate as possible. It must be realized, however, that their purpose is to give a general

idea of the battle, for it cannot be pretended that they show the exact tracks of all the forces at all times. It is believed that they do not contain errors large enough to give one a false idea of the action.

II. COMPARISON OF THE OPPOSING FORCES

It seems proper that before commencing the description of the action we should see how the opposing forces compared to one another. In this comparison we need consider only four classes of ships: Dreadnought battleships, battle cruisers, light cruisers and destroyers. The British had eight armored cruisers present and the Germans had six pre-dreadnought battleships. The total results gained by the armored cruisers was to cripple the light cruiser *Wiesbaden* with gunfire; except for this they merely served as excellent targets for the guns of the German battle fleet. On the other hand, the pre-dreadnought battleships proved to be perfect targets for the torpedoes of the British destroyers; in addition, their slow speed was a positive menace to the greatly inferior German fleet and after the battle they were eliminated from the High Sea Fleet. As both armored cruisers and pre-dreadnought battleships did nothing but to swell the losses of their own sides it will not be necessary to consider them in the present comparison.

Sir Eustace D'Eyncourt in a paper entitled "Naval Construction During the War" states that at the Battle of Jutland the Grand Fleet had a superiority over the High Sea Fleet in weight of broadside of 175 per cent. This means that for each pound of metal thrown in the German broadside there were $2\frac{3}{4}$ British pounds, or a superiority of nearly 3 to 1. Such a comparison is, however, unfair to the British. I have always held that the only fair basis of comparison is the displacement. When a ship of a certain displacement is designed, a certain proportion of this displacement must be allotted to the offensive armament, to armor and defensive arrangements and to the motive power. The amounts allowed to motive power by the British and German constructors were practically the same. However, the British then specialized on their offensive armament and to a considerable extent neglected their armor; while the Germans, on the other hand, specialized on their armor and defensive arrangements and to a considerable extent neglected their offensive armament. It is

amusing to see the British writers comment so bitterly upon the German superiority in armor and to see the German writers lament upon the British superiority in gunfire. It seems fair to assume that the British and German naval constructors were equally efficient and that the British superiority in gunfire counterbalanced the German superiority in armor. This is Admiral Jellicoe's opinion, for he states that "the true comparison lay between the *displacement* of the ships of the various classes."

Let us therefore obtain the displacements of the British and German battleships which took part in the battle. As there is a little discrepancy in the figures given by the various authorities, I take them directly from Admiral Jellicoe's book:

British Battleships	Displacement
Bellerophon	18,600
Temeraire	18,600
Superb	18,600
St. Vincent	19,250
Collingwood	19,250
Vanguard	19,250
Neptune	20,000
Hercules	20,000
Colossus	20,000
Orion	22,500
Conqueror	22,500
Monarch	22,500
Thunderer	22,500
Ajax	23,000
Centurion	23,000
King George V	23,000
Iron Duke	25,000
Marlborough	25,000
Benbow	25,000
Barham	27,500
Malaya	27,500
Warspite	27,500
Valiant	27,500
Canada	28,000
Erin	23,000
Agincourt	27,500
Royal Oak	25,750
Revenge	25,750
28 ships	647,550
Average	23,127

German Battleships	Displacement
Nassau	18,600
Posen	18,600
Rheinland	18,600
Westfalen	18,600
Ostfriesland	22,440
Helgoland	22,440
Oldenburg	22,440
Thuringen	22,440
Kaiser	24,410
Friedrich der Grosse	24,410
Kaiserin	24,410
Konig Albert	24,410
Konig	25,390
Grosser Kurfürst	25,390
Markgraf	25,390
Kronprinz	25,390
16 ships	363,360
Average	22,585

Thus there were 28 British battleships against 16 German; the average displacement of the British battleships was slightly greater than the German; the British were superior in total displacement in the ratio of 1.78 to 1. You will note that on the British side the *Dreadnaught, Emperor of India* and *Queen Elizabeth* were absent; on the German side one ship of the *Kaiser* class was missing; I believe this ship was the *Prinzregent Luitpold*.

We will now compare the British and German battle cruisers. I use the figures of Admiral Jellicoe:

British Battle Cruisers	Displacement
Tiger	28,500
Lion	26,350
Queen Mary	26,350
Princess Royal	26,350
New Zealand	18,800
Indefatigable	18,800
Invincible	17,250
Indomitable	17,250
Inflexible	17,250
9 ships	196,900
Average	21,880

German Battle Cruisers	Displacement
Derfflinger	26,180
Lutzow	26,180
Seydlitz	24,610
Moltke	22,640
Von der Tann	19,100
5 ships	118,710
Average	23,742

The British had nine battle cruisers against five German; the average displacement of the German ships was considerably greater than the British; the British were superior in total displacement in the ratio of 1.66 to 1. The British battle cruiser *Australia* was not present at the battle. The total displacement of the British battleships and battle cruisers combined was 844,450 against 482,070, a ratio of 1.75 to 1.

Admiral Jellicoe lists 26 light cruisers as having been present. According to Jane their average displacement figures at 4165. The following German light cruisers are mentioned in various reliable reports of the battle:

Rostock.	*Elbing.*	*Stettin.*	*Munchen.*
Wiesbaden.	*Regensburg.*	*Hamburg.*	*Frauenlob.*

The following light cruisers could possibly have been present:

Frankfurt	*Strassbourg.*	*Stuttgart.*	*Lubeck.*
Pillau.	*Kolberg.*	*Danzig.*	*Stralsund.*
Graudenz.	*Augsburg.*	*Berlin.*	

It is known that the second scouting group accompanied Hipper. The seaplane sent up by the *Engadine* reported sighting four light

cruisers. When Hipper turned to the southward his light cruisers followed him. At 4.08 p. m. the fifth battle squadron opened fire on these light cruisers instead of on the German battle cruisers, so that as late as this they were still well astern of the battle cruisers. At 4.15 the light cruiser *Regensburg* moved out to support a destroyer attack from a position ahead of the battle cruisers. I assume therefore that this ship was employed as a destroyer leader, thus giving Hipper a total of five light cruisers. Scheer also must have had at least two scouting groups of four light cruisers each. At about 6 p. m. the third battle cruiser squadron was engaging two groups of German light cruisers; there were three vessels in the first group, but the number in the second is not given. At the same time the first cruiser squadron was engaging three or four light cruisers of still another group. I therefore assume that Scheer had two groups of four light cruisers each in addition to the ones with Hipper and that he had two light cruisers as destroyer flotilla leaders. This gives a total of 15 light cruisers for the Germans. The *Revista Marittima* gives only 11 vessels, but I consider the larger number more probable. The average displacement of the 19 German light cruisers listed above is 4100, or practically the same as that of the British light cruisers. The superiority of the British in this class was therefore 26 to 15, or 1.74 to 1.

According to Admiral Jellicoe's list, the British had 78 destroyers; their total displacement was 77,200, an average of 990 tons per boat. Admiral Jellicoe states that the Germans had 88 destroyers; he apparently means eight full flotillas of 11 boats each. At that time there were attached to the Grand Fleet 80 destroyers, of which 70 were ready for sea, which Admiral Jellicoe states was "an unusually large proportion." The additional eight destroyers were of the Harwich force. As the Germans did not put to sea as the result of a long-considered plan, it is fair to assume that only $\frac{7}{8}$ of their destroyers were actually ready for sea, or 77 boats. On 21 February, 1919, the New York *Times* states that "it is learned officially by Reuter's that 77 German destroyers were present." The *Revista Marittima* of April, 1919, also gives the Germans this very number of destroyers. I therefore assume that 77 German destroyers were present. It is difficult to compare the German and British destroyers; the British boats carried a heavier battery of guns; the Germans had six tubes to

four for the British. It is difficult to determine the average displacement of the German destroyers. Eleven boats of 1250 or 1300 tons were completed in 1915. Assuming that all these were present, their total displacement was 14,100 for the 11 boats. No other German destroyers exceeded 750 tons, while there were various classes of destroyers of 555, 561, 640 and 700 tons, respectively, which were present at Jutland. The five boats sunk were:

V-4	561 tons.
V-27	640 tons.
V-29	640 tons.
V-48	750 tons.
S-35	700 tons.
Total	3291 tons.
Average	658 tons.

Assuming that the average displacement was 700 tons for the other 66 German destroyers the total displacement for these 66 boats would be 46,200. Therefore we have the following:

11 German destroyers:	Average displacement 1282	Total displacement	14,100
66 German destroyers:	Average displacement 700	Total displacement	46,200
Grand total			60,300

The total displacement of British destroyers was therefore superior to the total displacement of the German destroyers in the ratio of 1.28 to 1.

The British superiority in battleships, battle cruisers and light cruisers was therefore 1.75 to 1; in destroyers it was 1.28 to 1. I therefore consider their total superiority to be 1.60 to 1, or 8 to 5.

III. THE POSITIONS OF THE OPPOSING FLEETS AT 2 P. M. 31 MAY, 1916, G. M. T.

At 2 p. m., G. M. T., the main body of the Grand Fleet, under the personal command of Admiral Jellicoe, was in position Latitude 57° 57′ N., Longitude 3° 45′ E. The battle fleet was disposed in line of divisions, the line of bearing of the division flagships being 26° true and the course 116° true. The formation of the battle fleet was as follows:

DIRECTION OF ADVANCE

Second battle squadron		Fourth battle squadron		First battle squadron	
First div.	Second div.	Third div.	Fourth div.	Fifth div.	Sixth div.
King George V	*Orion*	*Iron Duke*	*Benbow*	*Colossus*	*Marlborough*
Ajax	*Monarch*	*Royal Oak*	*Bellerophon*	*Collingwood*	*Revenge*
Centurion	*Conqueror*	*Superb*	*Temeraire*	*Neptune*	*Hercules*
Erin	*Thunderer*	*Canada*	*Vanguard*	*St. Vincent*	*Agincourt*

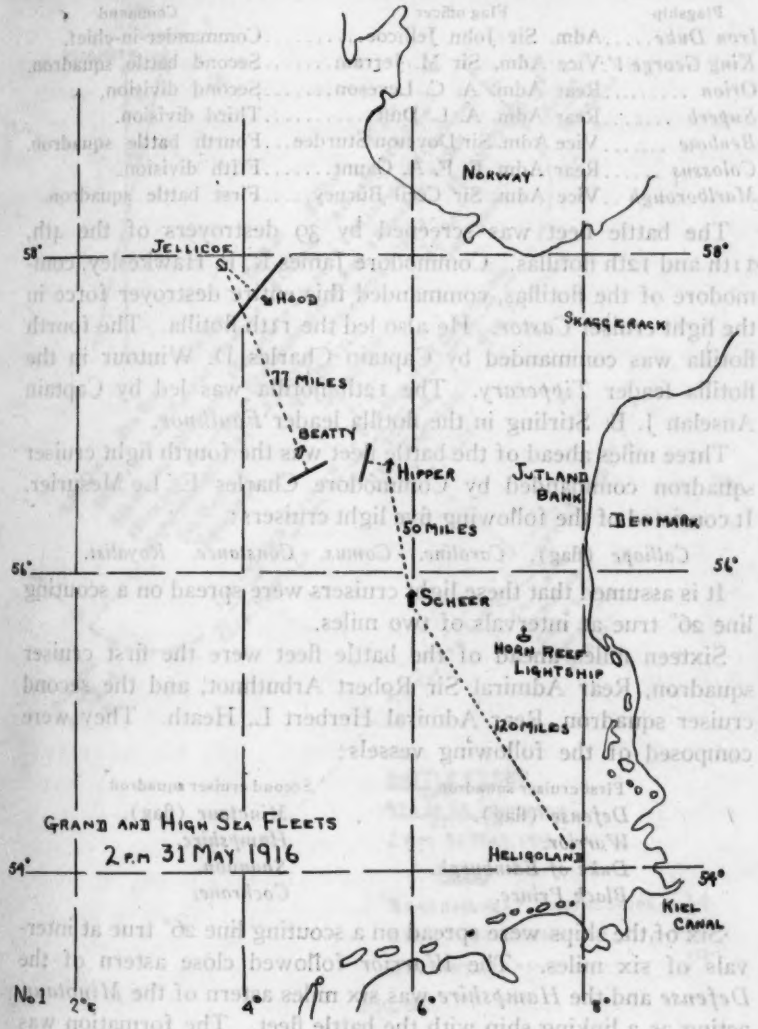

NORWAY
58°
JELLICOE
58°
HOOD
SKAGGERRACK
77 MILES
BEATTY
HIPPER
JUTLAND BANK
DENMARK
50 MILES
56°
56°
SCHEER
HORN REEF LIGHTSHIP
120 MILES
GRAND AND HIGH SEA FLEETS
2 P.M 31 MAY 1916
54°
HELIGOLAND
54°
KIEL CANAL
No 1
2°E
4°
6°
8°

FIG. 1.

The flagships and flag officers of the battle fleet were:

Flagship	Flag officer	Command
Iron Duke	Adm. Sir John Jellicoe	Commander-in-chief.
King George V.	Vice Adm. Sir M. Jerram	Second battle squadron.
Orion	Rear Adm. A. C. Leveson	Second division.
Superb	Rear Adm. A. L. Duff	Third division.
Benbow	Vice Adm. Sir Doveton Sturdee	Fourth battle squadron.
Colossus	Rear Adm. E. F. A. Gaunt	Fifth division.
Marlborough	Vice Adm. Sir Cecil Burney	First battle squadron.

The battle fleet was screened by 39 destroyers of the 4th, 11th and 12th flotillas. Commodore James R. P. Hawkesley, commodore of the flotillas, commanded this entire destroyer force in the light cruiser *Castor*. He also led the 11th flotilla. The fourth flotilla was commanded by Captain Charles D. Wintour in the flotilla leader *Tipperary*. The 12th flotilla was led by Captain Anselan J. B. Stirling in the flotilla leader *Faulknor*.

Three miles ahead of the battle fleet was the fourth light cruiser squadron commanded by Commodore Charles E. Le Mesurier. It consisted of the following five light cruisers:

Calliope (flag). *Caroline*. *Comus*. *Constance*. *Royalist*.

It is assumed that these light cruisers were spread on a scouting line 26° true at intervals of two miles.

Sixteen miles ahead of the battle fleet were the first cruiser squadron, Rear Admiral Sir Robert Arbuthnot, and the second cruiser squadron, Rear Admiral Herbert L. Heath. They were composed of the following vessels:

First cruiser squadron	Second cruiser squadron
Defense (flag).	*Minotaur* (flag).
Warrior.	*Hampshire*.
Duke of Edinburgh.	*Shannon*.
Black Prince.	*Cochrane*.

Six of the ships were spread on a scouting line 26° true at intervals of six miles. The *Warrior* followed close astern of the *Defense* and the *Hampshire* was six miles astern of the *Minotaur*, acting as a linking ship with the battle fleet. The formation was as follows:

DIRECTION OF ADVANCE

Cochrane. *Shannon*. *Minotaur*. (F.). *Defense* (F.). *Duke of Edinburgh*. *Black Prince*.
Warrior.
Hampshire (six miles astern of *Minotaur*).

Each cruiser was accompanied by one destroyer.

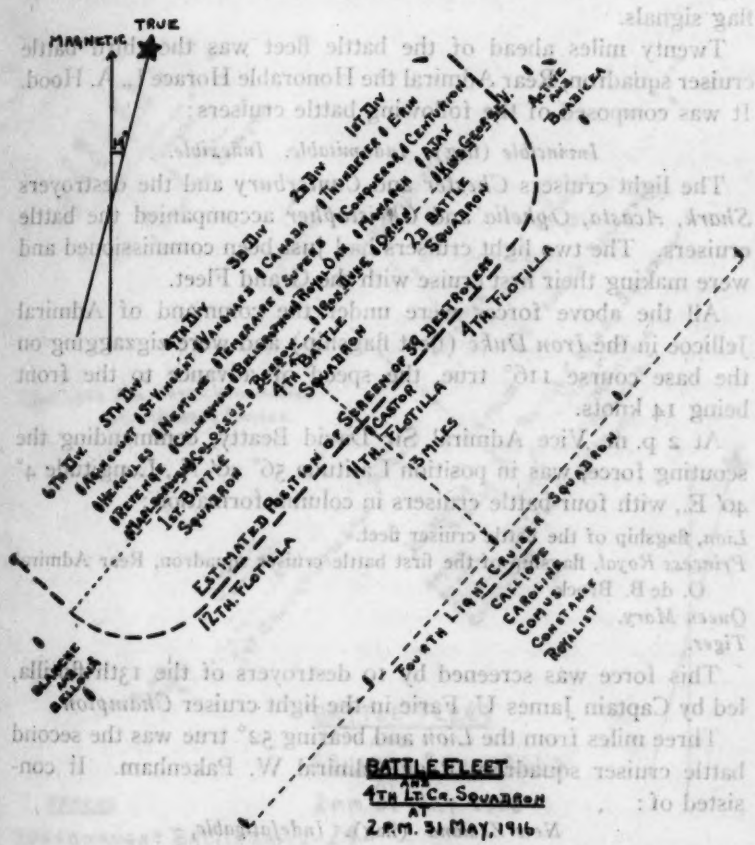

MAGNETIC
TRUE
1ST DIV
ACTIVE AND BOADICEA
2ND DIV
3RD DIV
CANADA
2ND BATTLE SQUADRON
4TH DIV
5TH DIV
4TH BATTLE SQUADRON
SCREEN OF 39 DESTROYERS
4TH FLOTILLA
CASTOR
11TH FLOTILLA
13 MILES
6TH DIV
1ST BATTLE SQUADRON
ESTIMATED POSITION OF
12TH FLOTILLA
TO 4TH LIGHT CRUISER SQUADRON
CALLIOPE
CAROLINE
COMUS
CONSTANCE
ROYALIST
BATTLE FLEET
AND
4TH LT. CR. SQUADRON
AT
2 P.M. 31 MAY, 1916
FORCES
BREADNAUGHT BATTLESHIPS - 24
LIGHT CRUISERS - 10
DESTROYERS - 39

FIG. 2.

Four light cruisers, *Blanche, Bellona, Boadicea* and *Active,* proceeded on the flanks of the battle fleet to act as repeating ships for flag signals.

Twenty miles ahead of the battle fleet was the third battle cruiser squadron, Rear Admiral the Honorable Horace L. A. Hood. It was composed of the following battle cruisers:

Invincible (flag). *Indomitable. Inflexible.*

The light cruisers *Chester* and *Canterbury* and the destroyers *Shark, Acasta, Ophelia* and *Christopher* accompanied the battle cruisers. The two light cruisers had just been commissioned and were making their first cruise with the Grand Fleet.

All the above forces were under the command of Admiral Jellicoe in the *Iron Duke* (fleet flagship) and were zigzagging on the base course 116° true, the speed of advance to the front being 14 knots.

At 2 p. m. Vice Admiral Sir David Beatty, commanding the scouting force, was in position Latitude 56° 40′ N., Longitude 4° 40′ E., with four battle cruisers in column formation:

Lion, flagship of the battle cruiser fleet.
Princess Royal, flagship of the first battle cruiser squadron, Rear Admiral O. de B. Brock.
Queen Mary.
Tiger.

This force was screened by 10 destroyers of the 13th flotilla, led by Captain James U. Farie in the light cruiser *Champion.*

Three miles from the *Lion* and bearing 52° true was the second battle cruiser squadron, Rear Admiral W. Pakenham. It consisted of:

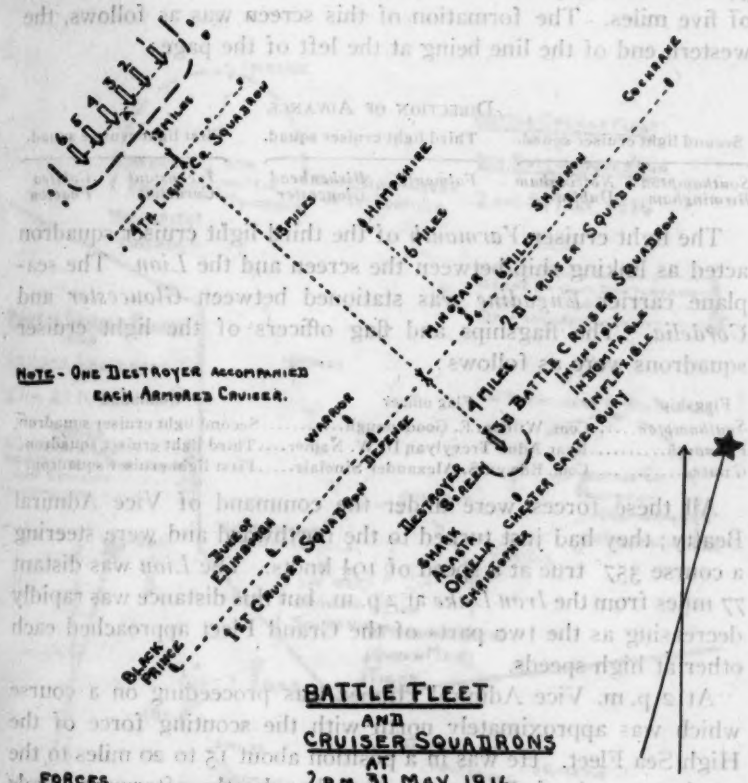
New Zealand (flag). *Indefatigable.*

It was screened by six destroyers of the Harwich force.

Five miles from the *Lion* and bearing 324° true was the fifth battle squadron, Rear Admiral H. Evan-Thomas. It consisted of four fine dreadnought battleships of 25 knots speed and which carried the heavy battery of eight 15-inch guns. The ships were:

Barham (flag). *Valiant. Warspite. Malaya.*

This squadron was screened by nine destroyers of the first flotilla, led by Captain Charles D. Roper in the light cruiser *Fearless.* Two additional destroyers of the Harwich force accompanied the scouting force, but their positions are not stated. The Harwich destroyers belonged to the ninth and tenth flotillas.



BATTLE FLEET
AND
CRUISER SQUADRONS
AT
2 P.M. 31 MAY, 1916

FORCES	
DREADNAUGHT BATTLESHIPS	24
BATTLE CRUISERS	3
LIGHT CRUISERS	12
ARMORED CRUISERS	8
DESTROYERS	51

FIG. 3.

Eight miles, 144° true, from the *Lion* was a screen formed by the first, second and third light cruiser squadrons on a line of bearing 54° true. Two light cruisers were placed together at every interval of five miles. The formation of this screen was as follows, the western end of the line being at the left of the page:

DIRECTION OF ADVANCE

Second light cruiser squad.		Third light cruiser squad.		First light cruiser squad.	
Southampton	*Nottingham*	*Falmouth*	*Birkenhead*	*Inconstant*	*Galatea*
Birmingham	*Dublin*		*Gloucester*	*Cordelia*	*Phaeton*

The light cruiser *Yarmouth* of the third light cruiser squadron acted as linking ship between the screen and the *Lion*. The sea-plane carrier *Engadine* was stationed between *Gloucester* and *Cordelia*. The flagships and flag officers of the light cruiser squadrons were as follows:

Flagship	Flag officer	Command
Southampton	Com. William E. Goodenough	Second light cruiser squadron.
Falmouth	Rear Adm. Trevylyan D. W. Napier	Third light cruiser squadron.
Galatea	Com. Edwyn S. Alexander-Sinclair	First light cruiser squadron.

All these forces were under the command of Vice Admiral Beatty; they had just turned to the northward and were steering a course 357° true at a speed of 19½ knots. The *Lion* was distant 77 miles from the *Iron Duke* at 2 p. m., but this distance was rapidly decreasing as the two parts of the Grand Fleet approached each other at high speeds.

At 2 p. m. Vice Admiral Hipper was proceeding on a course which was approximately north with the scouting force of the High Sea Fleet. He was in a position about 15 to 20 miles to the southeastward of Beatty, so that he shortly afterward made contact with the British light cruiser screen. Hipper commanded in person the first battle cruiser division composed of:

Lutzow (flag). *Derfflinger*. *Seydlitz*. *Moltke*. *Von der Tann*.

Four light cruisers of the second scouting group formed a scouting line to the northwest. Two destroyer flotillas were also present. While the normal German flotilla consisted of 11 boats, I assume that only 15 boats were actually present, as only this number participated in the massed destroyer attack at 4.15 p. m. I also assume that the light cruiser *Regensburg* was present in addition to the other four light cruisers and that it acted as the flagship for the two destroyer flotillas.

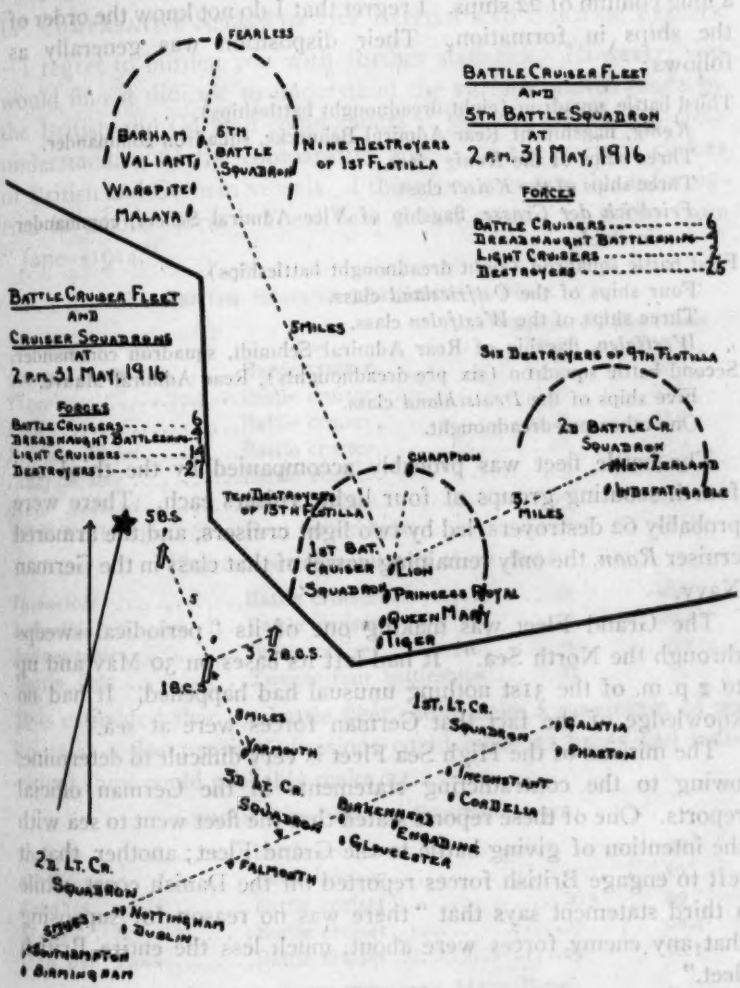

FEARLESS
BARHAM
VALIANT
WARSPITE
MALAYA
5TH BATTLE SQUADRON
NINE DESTROYERS OF 1ST FLOTILLA
BATTLE CRUISER FLEET AND 5TH BATTLE SQUADRON AT 2 P.M. 31 MAY, 1916
FORCES
BATTLE CRUISERS 6
DREADNAUGHT BATTLESHIPS 4
LIGHT CRUISERS 2
DESTROYERS 25
BATTLE CRUISER FLEET AND CRUISER SQUADRONS AT 2 P.M. 31 MAY, 1916
FORCES
BATTLE CRUISERS 6
DREADNAUGHT BATTLESHIPS 4
LIGHT CRUISERS 14
DESTROYERS 27
5 MILES
SIX DESTROYERS OF 9TH FLOTILLA
2ND BATTLE CR. SQUADRON
NEW ZEALAND
INDEFATIGABLE
CHAMPION
TEN DESTROYERS OF 13TH FLOTILLA
3 MILES
58.S
1ST BAT. CRUISER SQUADRON
LION
PRINCESS ROYAL
QUEEN MARY
TIGER
3 2B.C.S
18.C.S
5 MILES
YARMOUTH
1ST. LT. CR. SQUADRON
GALATIA
PHAETON
INCONSTANT
CORDELIA
3RD LT. CR. SQUADRON
BIRKENHEAD
ENCARDINE
GLOUCESTER
FALMOUTH
2ND LT. CR. SQUADRON
5 MILES
NOTTINGHAM
DUBLIN
SOUTHAMPTON
BIRMINGHAM

Fig. 4.

About 50 miles to the southward of Hipper was the main body of the High Sea Fleet under the command of Vice Admiral Scheer. It was composed of three battle squadrons and was apparently in a long column of 22 ships. I regret that I do not know the order of the ships in formation. Their disposition was generally as follows:

Third battle squadron (eight dreadnought battleships).
Konig, flagship of Rear Admiral Behnecke, squadron commander.
Three ships of the *Konig* class.
Three ships of the *Kaiser* class.
Friedrich der Grosse, flagship of Vice Admiral Scheer, commander-in-chief.
First battle squadron (eight dreadnought battleships).
Four ships of the *Ostfriesland* class.
Three ships of the *Westfalen* class.
Westfalen, flagship of Rear Admiral Schmidt, squadron commander.
Second battle squadron (six pre-dreadnoughts), Rear Admiral Mauve.
Five ships of the *Deutschland* class.
One other pre-dreadnought.

The battle fleet was probably accompanied by the third and fourth scouting groups of four light cruisers each. There were probably 62 destroyers, led by two light cruisers, and the armored cruiser *Roon*, the only remaining vessel of that class in the German Navy.

The Grand Fleet was making one of its "periodical sweeps through the North Sea." It had left its bases on 30 May and up to 2 p. m. of the 31st nothing unusual had happened. It had no knowledge of the fact that German forces were at sea.

The mission of the High Sea Fleet is very difficult to determine, owing to the contradicting statements in the German official reports. One of these reports stated that the fleet went to sea with the intention of giving battle to the Grand Fleet; another, that it left to engage British forces reported off the Danish coast, while a third statement says that "there was no reason for supposing that any enemy forces were about, much less the entire British fleet."

The German mission was probably one of the following:

1. To make a practice cruise.
2. To strike a blow at the trade between England and Norway.
3. To attempt to cut off light British forces reported off the Danish coast.
4. To escort one or more raiders out to sea.

It seems certain that neither British nor Germans expected a contact between even battle cruisers, much less a contact between the two battle fleets.

IV. Comparative Speeds of the British and German Vessels

I regret to burden you with further statistics. However, you would find it difficult to understand the various moves made by the British and German commanders if you did not have a clear understanding of the comparative speeds of the various classes of British and German vessels. I therefore give you this information in tabular form. The "best recent speed" is taken from "Jane—1914."

British Ships of the Scouting Force

Name	Class	Designed speed	Best recent speed
Queen Mary	Battle cruiser	27	33
Tiger	Battle cruiser	27	32[1]
Lion	Battle cruiser	27	31.7
Princess Royal	Battle cruiser	28	32.4
Indefatigable	Battle cruiser	25	29.13
New Zealand	Battle cruiser	25	29[1]
Fifth battle squadron	Four battleships	25	25[1]

British Ships with the Main Body

Invincible	Battle cruiser	25	28.6
Inflexible	Battle cruiser	25	28.4
Indomitable	Battle cruiser	25	28.7
Battle fleet	Twenty-four battleships	21	..

It is estimated that the battle fleet could make a maximum of 20 knots as a fleet; several divisions could make 22 knots and individual ships could probably make 23.

German Ships of the Scouting Force

Lutzow	Battle cruiser	..	30[1]
Derfflinger	Battle cruiser	..	30[1]
Seydlitz	Battle cruiser	26.5	29
Moltke	Battle cruiser	27	28.4
Von der Tann	Battle cruiser	25	28.1

German Ships with the Main Body

Konig class	Four battleships	21.	23[1]
Kaiser class	Four battleships	20.5	23
Ostfriesland class	Four battleships	20.5	22
Westfalen class	Four battleships	19.5	20.5
Deutschland class	Five pre-dreadnoughts	18	18[1]

[1] Estimated.

It is considered that the battle fleet could make a fleet speed of 17 knots; if the second battle squadron were left behind a fleet speed of 19 knots could probably be made.

From a glance at the table you will see that Beatty could fight with his entire force of 10 ships if he were content to steam at 25 knots; he could make 29 knots with six battle cruisers and 32 knots with his four best battle cruisers. I assume that the "best recent speeds" can be made for a short interval, due to the stimulus of battle.

On the other hand, Hipper could make 28 knots with his five battle cruisers. Therefore, if Beatty wished to fight with four ships to five—where he would be inferior in about the ratio of 9 to 10—he could gain at four knots speed. If he wished to fight with six ships to five—where he would be superior in about the ratio of 12 to 10—he could gain at the rate of one knot. If he wished to fight with 10 ships to five he would lose at the rate of three knots.

Now, consider the case of Scheer wishing to force an action on Beatty. If he wished to fight five battle cruisers against six British battle cruisers and four British battleships he could gain at the rate of three knots. If he wished to bring into action in addition his third battle squadron of eight battleships he would lose at the rate of two knots.

If Jellicoe wished to force Scheer to fight he could gain with 37 battleships and battle cruisers at the rate of three knots upon the German force of 21 battleships and battle cruisers and six pre-dreadnoughts. If Scheer left his pre-dreadnoughts to the mercy of the enemy, as Hipper was forced to do in the case of the *Blücher*, Jellicoe could still gain upon him at the rate of one knot.

Of course there is no way of telling just what each ship could make at the time of the Battle of Jutland and therefore you must consider all these figures approximately correct only. However, I believe that they are generally very close and that the conclusions given are substantially correct.

V. THE FIRST CONTACTS. 2.30 TO 3.30 P. M. POSITION 1

At 2.20 the eastern vessel of the light cruiser screen, *Galatea*, flagship of Commodore Alexander-Sinclair, commanding the first light cruiser squadron, sighted two German light cruisers of the

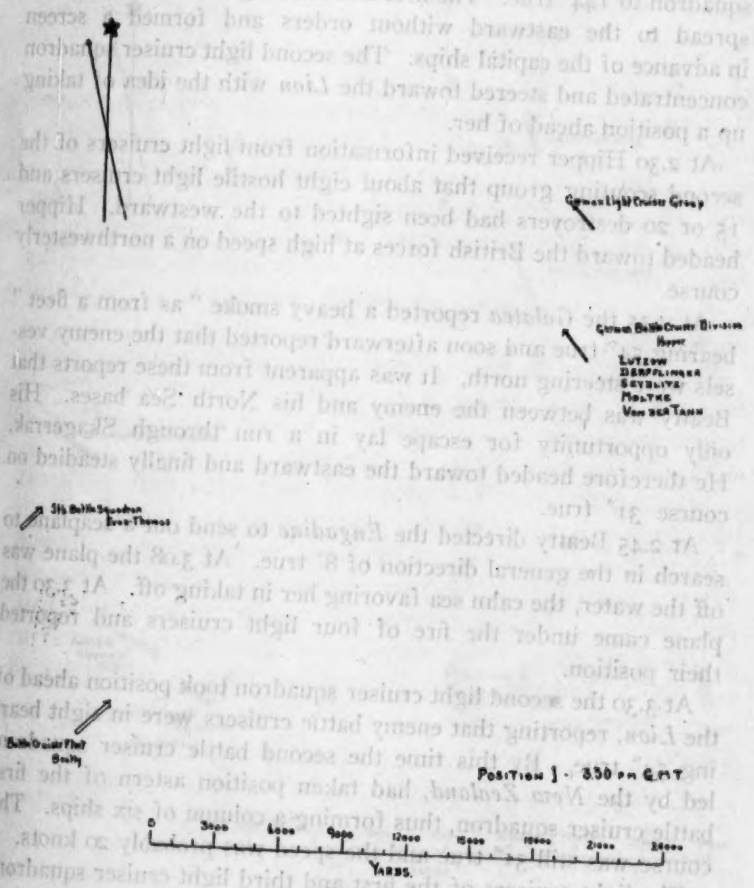

German Light Cruiser Group
German Battle Cruiser Division
Hipper
Lutzow
Derfflinger
Seydlitz
Moltke
Von der Tann
5th Battle Squadron
Barham
Battle Cruiser Fleet
Beatty
Position 1 - 3.30 p.m. G.M.T.
0
3000
6000
9000
12000
15000
18000
21000
24000
Yards.

FIG. 5.

second scouting group bearing about 98° true. They were engaged in boarding a neutral steamer. Immediately upon receiving this information Beatty decided to steer for Horn Reefs Lightship in order to cut off the Germans from their base. He accordingly changed course with the battle cruiser fleet and the fifth battle squadron to 144° true. The first and third light cruiser squadrons spread to the eastward without orders and formed a screen in advance of the capital ships. The second light cruiser squadron concentrated and steered toward the *Lion* with the idea of taking up a position ahead of her.

At 2.30 Hipper received information from light cruisers of the second scouting group that about eight hostile light cruisers and 15 or 20 destroyers had been sighted to the westward. Hipper headed toward the British forces at high speed on a northwesterly course.

At 2.35 the *Galatea* reported a heavy smoke "as from a fleet" bearing 54° true and soon afterward reported that the enemy vessels were steering north. It was apparent from these reports that Beatty was between the enemy and his North Sea bases. His only opportunity for escape lay in a run through Skagerrak. He therefore headed toward the eastward and finally steadied on course 31° true.

At 2.45 Beatty directed the *Engadine* to send out a seaplane to search in the general direction of 8° true. At 3.08 the plane was off the water, the calm sea favoring her in taking off. At 3.30 the plane came under the fire of four light cruisers and reported their position.

At 3.30 the second light cruiser squadron took position ahead of the *Lion,* reporting that enemy battle cruisers were in sight bearing 54° true. By this time the second battle cruiser squadron, led by the *New Zealand,* had taken position astern of the first battle cruiser squadron, thus forming a column of six ships. The course was still 31° true and the speed was probably 20 knots.

The light cruisers of the first and third light cruiser squadrons engaged German light cruisers at long range and retired before the approach of the hostile battle cruisers, which continued on their northwesterly course.

Upon receiving the first radio reports from the *Galatea,* Admiral Jellicoe directed the battle fleet to raise steam for full speed. The cruisers and battle cruisers had steam up for full speed before the

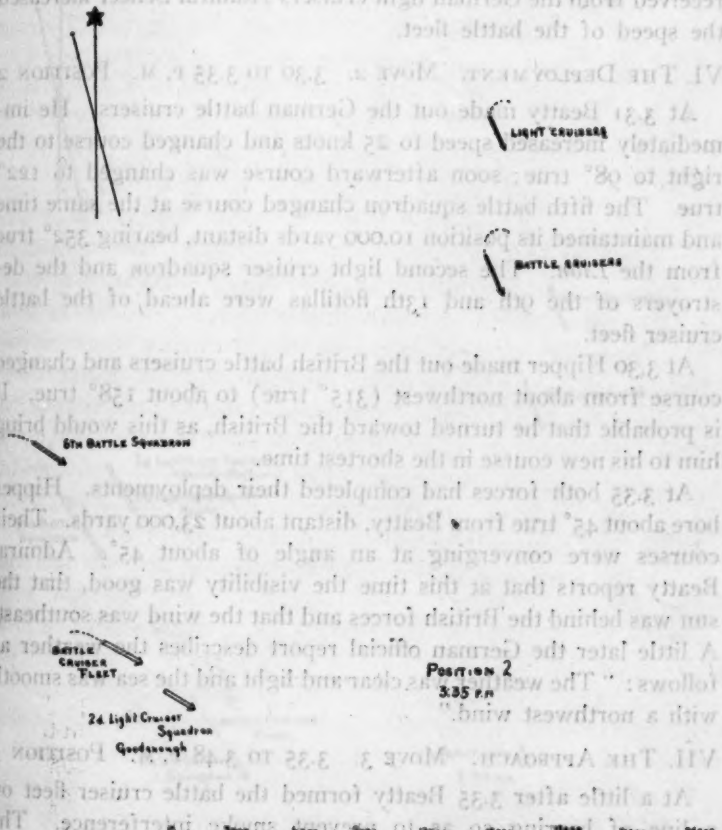

LIGHT CRUISERS
BATTLE CRUISERS
5TH BATTLE SQUADRON
BATTLE CRUISER FLEET
24 Light Cruiser Squadron
Goodenough
POSITION 2
3.35 P.M.
YARDS

FIG. 6.

contacts. The third battle cruiser squadron was ordered to proceed to a position which would cut off the escape of the German forces into the Skagerrak. At 3.10 the battle fleet was ordered to prepare for action.

When the first reports of the sighting of hostile vessels were received from the German light cruisers Admiral Scheer increased the speed of the battle fleet.

VI. THE DEPLOYMENT. MOVE 2. 3.30 TO 3.35 P. M. POSITION 2

At 3.31 Beatty made out the German battle cruisers. He immediately increased speed to 25 knots and changed course to the right to 98° true; soon afterward course was changed to 122° true. The fifth battle squadron changed course at the same time and maintained its position 10,000 yards distant, bearing 352° true from the *Lion*. The second light cruiser squadron and the destroyers of the 9th and 13th flotillas were ahead of the battle cruiser fleet.

At 3.30 Hipper made out the British battle cruisers and changed course from about northwest (315° true) to about 158° true. It is probable that he turned toward the British, as this would bring him to his new course in the shortest time.

At 3.35 both forces had completed their deployments. Hipper bore about 45° true from Beatty, distant about 23,000 yards. Their courses were converging at an angle of about 45°. Admiral Beatty reports that at this time the visibility was good, that the sun was behind the British forces and that the wind was southeast. A little later the German official report describes the weather as follows: "The weather was clear and light and the sea was smooth with a northwest wind."

VII. THE APPROACH. MOVE 3. 3.35 TO 3.48 P. M. POSITION 3

At a little after 3.35 Beatty formed the battle cruiser fleet on a line of bearing so as to prevent smoke interference. The remainder of the British forces and all the German forces continued on their courses. The first and third light cruiser squadrons were concentrating on the battle cruiser fleet.

At 3.40 Admiral Jellicoe received a report from Beatty that he had sighted five battle cruisers and a number of destroyers. Immediately the course of the battle fleet was changed to 132° true in order to close the battle cruiser fleet and speed was increased as rapidly as possible.

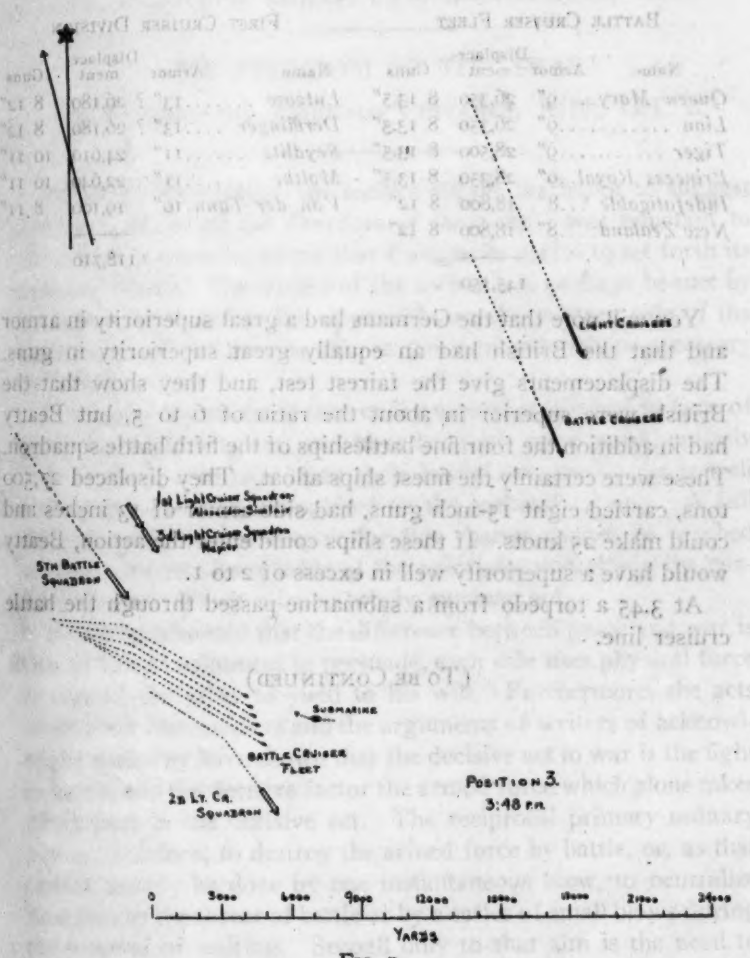

LIGHT CRUISERS
BATTLE CRUISERS
1st Light Cruiser Squadron
Alexander-Sinclair
3d Light Cruiser Squadron
Napier
5TH BATTLE SQUADRON
SUBMARINE
BATTLE CRUISER FLEET
2D LT. CR. SQUADRON
POSITION 3.
3:48 P.M.
0
5000
10000
15000
20000
25000
YARDS

FIG. 7.

In order that you may understand the results of the action which was fought between Beatty and Hipper, I ask you to glance over the characteristics of the opposing forces:

BATTLE CRUISER FLEET				FIRST CRUISER DIVISION			
Name	Armor	Displacement	Guns	Name	Armor	Displacement	Guns
Queen Mary	9"	26,350	8 13.5"	*Lutzow*	13" ?	26,180	8 12"
Lion	9"	26,350	8 13.5"	*Derfflinger*	13" ?	26,180	8 12"
Tiger	9"	28,500	8 13.5"	*Seydlitz*	11"	24,610	10 11"
Princess Royal	9"	28,350	8 13.5"	*Moltke*	11"	22,640	10 11"
Indefatigable	8"	18,800	8 12"	*Von der Tann*	10"	19,100	8 11"
New Zealand	8"	18,800	8 12"				
		145,150				118,710	

You will note that the Germans had a great superiority in armor and that the British had an equally great superiority in guns. The displacements give the fairest test, and they show that the British were superior in about the ratio of 6 to 5, but Beatty had in addition the four fine battleships of the fifth battle squadron. These were certainly the finest ships afloat. They displaced 27,500 tons, carried eight 15-inch guns, had side armor of 13 inches and could make 25 knots. If these ships could enter the action, Beatty would have a superiority well in excess of 2 to 1.

At 3.45 a torpedo from a submarine passed through the battle cruiser line.

(TO BE CONTINUED)

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U. S. NAVAL INSTITUTE, ANNAPOLIS, MD.

THE FREEDOM OF THE SEAS[1]

By Admiral Sir Reginald Custance, R. N., G. C. B.

When the secretary to the society did me the honor to suggest reading a paper on the *Freedom of the Seas*, I was reluctant to do so until it occurred to me that it might be useful to set forth its military aspect. The wishes of the society will perhaps be met by an argument, based as far as possible, on the military side of the question and by reference only to the legal side where necessary to lucidity.

It is generally accepted that under normal conditions in time of peace the high seas are, and have been for some years, entirely free to those who pass upon their lawful occasions. As is well known this freedom is impaired on the outbreak of war. A full understanding of the reason for this change cannot be reached without a correct knowledge of the principles underlying the conduct of war. These may be briefly summarized.

It will be admitted that the difference between peace and war is that in lieu of argument to persuade, each side uses physical force to compel the other to yield to his will. Furthermore, the acts of all great commanders and the arguments of writers of acknowledged authority have shown that the decisive act in war is the fight or battle, and the decisive factor the armed force which alone takes direct part in the decisive act. The reciprocal primary military aim is, therefore, to destroy the armed force by battle, or, as that cannot usually be done by one instantaneous blow, to neutralize its action by the threat of battle or by a series of small blows during the interval of waiting. Second only to that aim is the need to impair the efficiency of the armed force, and thus to prepare its destruction by sapping the resources upon which it depends. The action taken to effect this is the same in principle whether ashore

[1] Read before the Grotius Society 15 July, 1919. A British Point of View.

or afloat. After the armed force has been defeated or neutralized, the victor or stronger side, on land overruns completely or partially the territory of the vanquished or weaker side, deprives him of its resources, and utilizes them himself, as did the Germans in Belgium, Northern France and Roumania during the late war.

Similarly at sea, movement on the ocean is more or less free to the stronger side, but is completely or partially denied to the weaker. Unarmed ships as potential instruments of war are seized and used by the captor. Supplies from the outside world can be imported by the stronger side, but are completely or partially cut off from the weaker. These supplies from abroad are sometimes very important, since they are often required to complete the food, clothing, armament and equipment of the armed forces and the food and clothing of the unarmed population, which by production and supply sustains the fighting man and thus plays an important part in carrying on the war, as was seen during the late war.

Moreover, the profits derived from handling the trade, especially that seaborne, are sometimes very large and may provide much of the wealth required to finance a war, as actually occurred in the case of Great Britain during the great French war. It will be seen that any stoppage of these supplies to a belligerent tends to reduce directly his armed strength by land and sea, and to impair indirectly the spirit and morale of both his armed force and his unarmed population. As a large proportion of these supplies is usually seaborne, the stoppage of sea trade cannot be looked upon as otherwise than an essential operation of war, since it prepares success in the decisive battle on land and sea, and thus tends to shorten the war. We have constantly to bear in mind that the interdependence between land and sea is close, although not always plainly seen; also that the reaction of the land operations on those at sea, *i. e.* of the land battle on the sea battle, and vice versa may be prolonged in time, but is always working during the war; also that as the land battle and the sea battle are dependent activities the double decision by land and sea or its equivalent is necessary. Furthermore, since the greater contains the less, stoppage of sea trade is also a legitimate means of coercion as a substitute for war in time of peace.

Now, sea trade is stopped by capture and by the threat of capture, which has for several generations been specifically recognized by the law of nations as a legitimate operation of war probably for

the reasons above set forth—either explicitly stated as in the case of contraband or implicitly accepted as in that of enemy goods. Furthermore, it is common knowledge that the losses due to actual capture are small compared with those due to the stoppage of trade and therefore the value of the prizes is of relatively small importance. Whatever may have been the case in the past this right of capture is claimed and exercised now as a means to weaken the enemy's armed force and to shorten the war. To resign or to weaken that right of capture is to throw extra stress on the fighting men on land and on sea, and ultimately on the nation. Under modern conditions, when whole nations take part directly or indirectly in the fighting, this extra stress may become very great.

As is well known, attempts to weaken the right of capture have been made at intervals from the 18th century onwards. The principal argument used has been that ships and cargoes are private property and that their capture is a hardship on private individuals. The argument has no real foundation, since for several generations both ships and cargoes have been insured with the result that the losses and the cost of insurance are borne by the whole body of consumers, who pay increased prices to cover them. Is there not some truth underlying the layman's remark that: "Seemingly the only safe place for belligerent private property is at sea."

Again, exception has been taken to the right to capture property on the ground that a different practice is followed on land. The most important difference is that the military commander is a law to himself, whereas, the proceedings of the naval commander are reviewed by a prize court. The former acts outside the law, the latter under the law. Attention is invited to the difference between the proceedings before the British prize court and those followed by Napoleon's marshals during the great French war and by the German generals during the war just ended. These are well known to you and need not be set forth in detail.

That maritime capture is humane when carried out under the rules recognized by international law is evident from the procedure established under them and by the practice of the past. The duty of the captor was then to bring in, for adjudication by a prize court, any merchant ship he detained. If the ship captured was an enemy, the rule was not always observed. The United

States made a practice of destroying enemy prizes in the war of 1812, but the British and French rule was always to bring them in, if possible. Whether the ship was brought in or not, the safety of the *personnel* was always secure, and the captor had to justify his proceedings before a prize court. He always acted under the law and was liable for costs and damages, if he took a ship without probable cause. The great change introduced by Germany in conducting the recent war consists in making war at sea inhumane in that the lives of both crew and passengers have been deliberately risked and sacrificed. She aimed at making war at sea as ruthless, brutal and lawless as it too often has been on land. The wisdom of calling upon the captor to justify his proceedings before a prize court cannot be doubted. The decision of the Paris conference seems to extend the principle and to apply it to those who break the law of nations, not only to those who sink ships without warning and thus risk the lives of passengers and crews, but to those who issue the orders to do so.

Again, sea trade is carried on ships, of which some belong to belligerents and others to neutrals, as also their cargoes. Hence neutral interests are affected, and many disputes arise about the rules relating to blockades, contraband, continuous voyage, etc., by which the trade of neutrals with belligerents is regulated and the inconvenience and loss to neutrals in some respects mitigated. In these disputes the immediate interest of the belligerent is complete stoppage of trade, while that of the neutral may seem to be its continuance uninterrupted although the reverse is often the case, as in the late great German war, when the general security and the reign of law were menaced.

Usually each side is held back from making extreme demands by action either already taken in the past or possibly required in the future when the parts are reversed. Moreover, the political object of the war, the many sided friction in the political and international machines, the relative strengths not only of the belligerents but of the neutrals, and the progress of the war all tend to influence the relations between belligerents and neutrals and the action respectively taken by them. In fact, the stoppage of neutral trade with a belligerent has always been dependent upon action taken by the belligerents and either accepted or tolerated by neutrals, or so much opposed by them that they have ultimately joined in the war. On the other hand, trade between

neutrals entirely clear of any belligerent taint has usually been free in time of war, except that neutral ships have been liable "to visit and search."

The existing practice having been thus sketched we turn to the second point in President Wilson's peace program, which reads:

> II. Absolute freedom of navigation upon the seas, outside territorial waters, alike in peace and war, except as the seas may be closed in whole or in part by international action for the enforcement of international covenants.

The allied governments took exception to this clause as being "open to various interpretations, some of which they could not accept." As some justification for this caution it may be remarked that absolute freedom of navigation upon the seas, outside territorial waters, in war seems to mean peace at sea and war on land, as otherwise there will be no war at all. War at sea will only begin when international action is taken. Thus, war at sea is to be limited by international action, but war on land is to remain unlimited. This result tends to undermine the principle that action by land and sea is interdependent. Again, it is to be specially noted that President Wilson accepts the long-established practice that the seas may be closed in whole or in part, but by international, instead of national, action and only to enforce international covenants. Everything will depend upon whether international action, in a righteous cause, can be made as rapid and efficient as that of a belligerent nation or group of nations fettered by friction with neutrals—an important point, seeing that upon it may depend the security of Great Britain and other countries.

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MINING OPERATIONS IN THE WAR

By Lieut. Commander Norman Van der Veer, U. S. Navy

From the very beginning of the war, Germany adopted a policy, and vigorously pursued a campaign of minelaying in the vicinity of the English coast; apparently she lost no opportunity of laying floating mines, where the water is too deep for anchorage, and fields of anchored mines in shoal water. To this policy, together with her universal reliance on the submarine, may be credited many of her successes, while England had recourse principally to gunfire. In the event of a decisive engagement in the North Sea these methods might easily have had a more far-reaching effect than is, at first glance, apparent. Certain it is that they caused the British fleet to concentrate at various bases on the coast of England and Scotland, where it, in turn, was thoroughly protected by mine-fields. And this widespread use of the mine has had another effect, in that it has served to create and develop that miniature navy, the trawler arm of the Grand Fleet. All along the coast of Great Britain these small craft gathered in surprisingly large numbers; in one port alone, over a thousand trawlers have been fitted out, and, it is said over 12,000 men were required in this branch of the service.

In the war mines were used for two distinct purposes: (1) To close military ports; (2) As a distinct operation against a hostile fleet or ship. The object of these uses requires no explanation. But, in addition to these recognized uses, mines have also been used in connection with no definite military scheme. The Germans seem to have scattered them on the chance of destroying individual men-of-war or merchant vessels of the enemy. An article of the Hague conference forbids the laying of automatic contact mines off the coast of the enemy with the sole purpose of intercepting commercial shipping. Germany signed this article "with reservation;" and this paper is not concerned with the situation from

the standpoint of international law, except, in passing, to invite attention to the fact that, as a result of serious damage to neutral shipping, we, in our note of February 22, 1915, suggested that "isolated drifting mines should be laid by neither party, that anchored mines should be laid exclusively for defensive purposes within range of harbors, to become harmless after breaking loose from their anchorages."

Considering first the laying of the mines for the purpose of closing military ports, and the effect thereof on naval strategy and tactics, reliable sources indicate that, during the latter part of the war, the following was the situation in regard to the ports of the North Sea.

Early in the war British submarines succeeded in entering the harbor of Kiel, only, as might have been anticipated, to find the German fleet protected by many minefields. Cuxhaven was heavily mined, as well as the mouths of the Weser, Jahde and Elbe, the mouths of the Scheldt and the approaches to Antwerp, the waters around Borkum, and, of course, Helgoland. There was no opportunity for these minefields to cause any actual damage to the British fleet. On the contrary, they proved to be a source of danger to the Germans themselves. For we read of a German patrol boat striking three mines near Borkum; and, pursuant to striking a chain of mines that blocked the entrance to Jahde Bay, the cruiser *Yorck* was totally destroyed, a tragedy that resulted in the sentencing of her commander to two years' detention in a fortress as a penalty for his negligence.

But even though these minefields in the vicinity of German ports caused no direct damage to the British, their strategical and tactical value has been vast. After the injuries to the *Lion* resulted in the temporary withdrawal of Sir David Beatty from the Dogger Bank engagement, the British fleet gave up the chase and countermarched at a distance of about fifty miles from Helgoland. The first English report of the battle states that the reason for abandoning the pursuit was due to the danger of running into minefields. In confirmation of this, there is the German report that Von Hipper, shortly after sighting the British squadron, some 120 miles from Helgoland, changed course to the southeast in order to draw the enemy toward the minefields. The mooted question as to whether the British would have turned back had Sir David Beatty been able to hold his place in formation does not now con-

cern us. The fact remains that the abandonment of the pursuit presumably because of the danger from mines may, as one writer has aptly pointed out, have robbed the British of a complete victory "in the Nelsonian sense."

Early in the war, the British Admiralty, as a result of the great activity of the Germans in minelaying, developed, on a considerable scale, an aggressive policy in this form of war on the sea. To reduce the risk to non-combatants, the Admiralty announced the parallels and meridians bounding a rectangle in the North Sea which was to be considered as a danger area, supplementing the notification with the caution: "Although these limits are assigned to the danger area, it must not be supposed that navigation is safe in any part of the southern waters of the North Sea. Instructions have been issued to His Majesty's ships to warn east-going vessels of the presence of minefields." In May, 1916, it was deemed advisable to extend the eastern and southern limits of the danger area and to publish the new limiting parallel and meridian.

In October 1914 the battleship *Audacious* sank after striking a mine off the North Irish coast, presumably while seeking suitable waters in which to hold her great gun practice. Shortly after this disaster neutral vessels were warned of the presence of mines off the north coast of Ireland, and there was set out in the North Channel a danger area the limits of which were made public. The purpose of this move was to close the greater portion of the North Channel, leading from the Atlantic into the Irish Sea. The parallelogram limiting this danger area occupied the north part of the channel, leaving a narrow passage between it and the Irish coast. This passage was to be used only in daytime, and no ship was to be within four miles of Rathlin Island between sunset and sunrise. This rendered it a simple proposition to examine vessels entering the Irish Sea from the westward, and made it extremely difficult for enemy minelayers to operate. It is also probable that this step had the effect of diverting the greater part of Atlantic traffic around the south of Ireland, where, owing to more sea room, there are greater facilities for maneuvering to avoid the attack of submarines.

In the Baltic, Germany originally conceived the project of forcing an entrance to Riga and landing an expeditionary force to co-operate with the left wing of her army. This she was unable to accomplish because of the well guarded minefields at the

entrance of the gulf. In addition to Riga, the coast waters of the Aland archipelago and the entrances and exits of the Gulf of Finland were heavily mined. The existence of minefields in international waters south of the Danish island of Saltholm, off the Drogeden lightship, along Falsterbo Reef, and near the approaches to Stockholm caused no little anxiety to the powers of Norway, Sweden and Denmark, striving as they were alike to protect the interests of neutrals and to avoid giving offence to either belligerent.

In the Asiatic, German minefields in Kiaochou Bay prolonged the defence of Tsingtau against the British and Japanese squadrons and effected the loss of the Japanese cruiser *Takachiko* and several torpedo boats. From a plan obtained after the capitulation, it is known that Germany had planted at least 300 mines in the harbor of Laoshan.

Perhaps of all the theaters of the war, the Dardanelles lent themselves most favorably to the use of the mine. It was possible to render this whole area impassable by the use of the three recognized types—contact, observation and floating. While the velocity of the current offered certain difficulties to the use of the contact type, the narrowness of the channel facilitated the use of the complicated device necessary to explode observation mines from the shore; and the constant danger from floating mines drifting down with the current from the sea of Marmora was one against which it was necessary to maintain eternal vigilance. It is known that contact mines, to the number of forty, were laid in double line from Kephez to Suandère. Yet all precautions taken by the Germans in the Dardanelles did not entirely suffice; witness the brilliant exploit of Lieutenant Holbrock, who, despite the difficult current, ran his submarine into the Dardanelles, dived under five rows of mines, and sank the Turkish battleship *Messudiyeh,* which was guarding the field.

Early in the war the port of Bourgas in the Black Sea was closed. Varna could be entered in daytime only, and vessels were forced to stop at Kamtchia and wait for a pilot.

The enemy mined the bay of Cattaro in the Adriatic. British and French torpedo-boats, dragging the bay, recovered more than 1000 mines; and the French destroyer *Dague* was blown up while dragging off Antivari.

To illustrate the second use of the mine—as a distinct operation against a hostile fleet or ship—there is, early in the war, the engagement that resulted in the mutual destruction of the *Koningen Luise* and the *Amphion*. The *Koningen Luise* was a Hamburg Amerika passenger vessel which had been converted into a minelayer. After she had probably laid a line of mines from Aldebrugh ridge to the northeast, she was sighted about sixty miles off the coast of Suffolk by the British light cruiser *Amphion*. The minelayer was pursued for 30 miles, overhauled and sunk. After picking up the survivors, the *Amphion*, on her return to port, when nearing the scene of the minelayer's operations, altered course to avoid the supposed danger; however, despite this precaution, she struck two mines and sank.

Subsequent to the light engagement in the North Sea that occurred during the first month of the war, Sir David Beatty reported to the Admiralty: "Our destroyers reported the presence of floating mines to the eastward, and I considered it inadvisable to pursue her." It is probable that the "two-funneled cruiser" the *Lion* was then pursuing had saved herself by launching floating mines.

The destruction of the battleship *Formidable* in the channel was due to a floating mine or to a submarine. And the loss of the *King Edward VII.* was presumably due to her striking a mine in the North Sea, off Spurn Head; the German Admiralty, in fact, attributed the credit of the destruction of this vessel to the mysterious commerce destroyer *Moewe*.

Especially in the Dardanelles has there been ample opportunity for the use of floating mines against a hostile fleet. Utilizing to the very fullest extent the strong current that sets from the Sea of Marmora to the Mediterranean, the Turks employed the floating mine after the fashion of a torpedo. And it is to this weapon that the loss of the battleships *Irresistible, Ocean,* and *Bouvet,* and the injury to the battle cruiser *Inflexible* have been attributed. Also the destruction of the battleship *Russell* in the Mediterranean was probably due to the explosion of a mine.

In addition to carrying out vigorously the policies hitherto recognized in regard to the use of the mine, the Germans inaugurated and pursued more aggressive measures. Making use without doubt of their submarine minelayers, they pushed their campaign to points surprisingly near the British coast. Neutral and

enemy vessels have been destroyed off the mouth of the Tyne, many of them within sight of Newcastle and Dover. The *Audacious* met her fate due to striking a minefield that the enemy had laid off the Irish coast. In fact, the British Admiralty issued warnings to the effect that neutral shipping was endangered by mines in this vicinity, thus admitting that German activities in this direction had extended even to the coast of Ireland. Mention has already been made of the counter measures adopted by England in the North Sea, the English Channel and the North Channel pursuant to Germany's vigorous campaign.

To say nothing of the loss of a host of smaller vessels, the destruction of the battleships *Audacious, Irresistible, Bouvet, Ocean, Formidable, Russell,* and *King Edward VII.,* is a large toll exacted of the allies as a result of mining operations. Nor should we overlook the destruction of the *Hampshire,* with the death of Lord Kitchener, and the incalculable loss to England that ensued therefrom.

As to the character of the mines used, it has been pointed out that they have been of the observation, the contact and the floating types.

In regard to the mechanical features of these mines there is, of course, but little available that is not confidential. But it is of interest to note the elementary details of a mine used largely by the Turks in the Dardanelles, called the Leon torpedo mine. This mine, invented by a Swedish officer, Captain Karl Leon, may be launched simply by placing it in the water, or by ejecting it in the same manner as the ordinary torpedo. Cylindrical in shape, the mine is divided into two separate compartments; the upper contains the explosive, together with the firing apparatus in a central tube; the lower compartment is itself divided into two sections, the upper of which contains a battery of accumulators, and the lower the machinery. Weights are arranged so that the mine, when submerged, retains a vertical position. This is accomplished by means of a chamber that fills with water, thus giving the mine a tendency to sink. The speed at which this chamber fills, and hence the rate at which the mine sinks is controlled by a valve. Even with a full reservoir, the mine is only slightly heavier than water, so that it never sinks rapidly. When a certain depth has been reached, the pressure of the outside water acts on a hydrostat which is arranged to close a switch connecting the

battery to a motor which drives the mine propeller. The mine then commences to rise. When a point within five feet of the surface has been reached, in consequence of the reduced pressure on the hydrostat, the battery switch opens, the motor stops and the mine sinks. It is possible to adjust the hydrostat so that the maximum immersion may be obtained within limits of five to ten feet from the surface. A clock device may be set to limit the length of time within which the mine is to remain active. This control is accomplished by interrupting the current at the end of the time set. The clock device may likewise be used to delay the time at which the mine is to become active. In the latter case, the mine remains at the bottom until, at the expiration of the time designated, the motor switch is closed and the propeller functions. A stabilizer is fitted in order to compensate for different densities of water.

The Leon mine may be used as a distinct operation against a hostile fleet or ship, or in the attack on a tidal port. For the latter purpose, mines are launched when the tide is flowing, and travel with the ingoing water. Where a long estuary is to be traversed, the clockwork is arranged to function after a given interval; when the tide ebbs, the mine sinks, to rise again when the flood renews. It is also possible so to arrange the mechanism that the battery is connected with the motor only at the end of a given period; when so adjusted, the mine finally comes to the surface and remains there until the battery runs down.

For the purpose of minelaying, all sorts and conditions of vessels were pressed into service. They ranged from converted destroyers and passenger steamers to the German submarine minelayers.

The French found very valuable three vessels of the *Casabianca* class. Originally built for destroyers, with a displacement of 950 tons, they proved to be too slow for this service. Accordingly, they were converted into minelayers, a process that raised their tonnage to 1020, and still further reduced their speed. Each of these vessels carried about 100 mines. The *Casabianca* was destroyed by one of her own mines while engaged in hazardous night work in the Aegean, but her sister ships, the *Cassini* and the *d'Iberville* rendered very valuable service. Later types of French minelayers were smaller in displacement—566 tons—but they carried 120 mines weighing 550 kilos each. Of this type were the *Pluton* and the *Cerbère*.

The German minelayer *Königin Luise* was a passenger steamer of 2200 tons, while the Russians successfully used vessels as large as the *Prout,* of 5000 tons, with a capacity of 700 mines.

For months after the outbreak of the war, there was great perplexity over the facility with which the Germans were able to plant mines within short distances of the English coast, and the British press was rife with statements to the effect that these mines had been laid by "pleasure steamers and fishing smacks," vessels flying neutral flags and merchantmen. In spite, however, of the vigilance of the British patrol, it does not appear that a single vessel of this description was actually captured or sunk while in the act of sowing mines while flying a neutral flag. It would therefore seem appropriate to attribute the greater part of this mineplanting to the activities of submarine minelayers which, it is now evident, Germany used for some time. The capture of the submarine minelayer *UC-5* cleared the mystery. This little vessel—the first of her kind captured— was 100 feet in length; she had a beam of 10 feet, 6 inches, and drew 11 feet when awash; she was propelled by a six cylinder Deisel engine of 250-horse-power. According to one of her crew—her complement was five officers and 13 men—she had made 19 trips from Germany to the British coast; on her 20th she was captured by a British patrol vessel. It is said that in the course of her various trips she laid over 200 mines in routes frequented by merchant vessels. The *UC-5,* one of the forerunners of a numerous class—was constructed in four sections. On top of the hull was a light superstructure of thin plating to make a level deck. Conning-tower, periscope and wireless mast were placed amidships. The entire hull forward of the conning-tower was a mine-carrying case. Countersunk in the deck was a row of six gratings; beneath each grating a steel chute slanted from top to bottom. This steel tube was fitted with flanged runners on which slide four stays holding the mines, of which each chute contained two. The mines were released by the operation of a lever fitted inside the hull. Once released, the mine sank to the bottom; then angle irons surrounding it were automatically released at the top, and, dropping outward and downward, lay on the bottom to form a rest for the mine. The anchor remained on the bottom, while the mine itself rises, hauling after it a steel wire which unwinds from a drum revolving within

the anchor. A hydrostatic valve was fitted to determine the depth at which the mine was to float below the surface.

Countermining operations took the usual forms of dragging, sweeping and detonating. There is little available data in regard to the last named method. Electricity has probably been used for this purpose; and many mines have been exploded by gunfire in the English Channel and off the coast of Antivari.

For the purpose of dragging and sweeping, torpedo-boats and destroyers have been especially valuable. In the Adriatic, sweeping operations by allied torpedo-boats resulted in the recovery of over 1000 mines in the Bay of Cattaro alone. The Germans effected their one entrance to the Gulf of Riga after several days of difficult mine-sweeping. British and French destroyers rendered especially valuable service in the Dardanelles. The entrance to Laoshan Bay was patrolled by sweeping destroyers with the assistance of trawlers and patrol boats; and several Japanese destroyers were blown up in the course of the operations.

Finally, the fleet of trawlers rendered inestimable service in mine-sweeping operations. It has been pointed out that this arm of the British fleet has attained astounding proportions; it is a veritable mosquito fleet in itself. Following raids on Scarborough and Hartlepool, over 1500 mines were picked up by trawlers in one week. In the course of work of this nature many boats were lost; frequently mines exploded in the nets. In addition to their value in work of this nature, it is claimed that there is no better protection for a battleship at anchor than a surrounding cordon of trawlers when danger from mines or submarines is apprehended. England has thoroughly demonstrated the value of the trawler fleet. Let us bear in mind that, if the time ever comes to require its service, it would be well for us to have ready to our hand a defensive weapon of such magnitude and efficiency.

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THE STUDY OF NAVAL HISTORY

By ASSOCIATE PROFESSOR H. J. FENTON, U. S. Naval Academy

Mahan says that the study of history is not theoretical but practical because it ends, not in speculation, but in action. If this be true of history in general, it must be peculiarly so of military history since the greater must always include the less, but still more so because no department of history is so likely to stir the imagination and to fill the soul with enthusiasm as that which deals with military operations.

But it is doubtful if all of us get quite this result from our gropings in history, although we may cover the field from Thucydides to Mahan, because we pay too much attention to the bare facts of history and ponder too little the suggestions. To many of us a military operation means so many objectives lost or taken, so many killed or wounded, somebody raised to the pinnacle of fame by victory, or somebody tumbled to oblivion by defeat. These little facts we tuck away in our minds like letters in a drawer, thinking that somehow or some day they will be of use to us. But what avails it to know that Napoleon was defeated at Waterloo if that is all there is to it? What avails it to know that hundreds died in one battle and thousands in another unless we sense and ponder the causes for which they gave their measure of devotion? Of what use is it to read that Nelson at Trafalgar shattered the power of Napoleon on the sea, unless reflection thereon creates in the reader a greater power for individual action?

"The greatest inspiration of my life," said Napoleon, "was a memory." Memory of what? Memory of battle tactics in some long past conflict, or lists of the dead or captured, or the names of the kings and queens, or the political or battle leaders of yesterday? Perhaps so, but I rather think it was the memory of some energetic action done or deed of heroism performed, or of someone—it may have been a general or a private—whose instant decision in a tremendous crisis changed the course of history. I would not in this connection belittle the knowledge of names and dates or of the movements of fleets and armies. These facts have their

value, but it is not supreme. They are useful items for mental lucubrations or for vigorous argument or conversation. But unless somehow they end in action on our part they are theoretical rather than practical. It is in the reaction of historical facts on us that their chief value lies.

From a somewhat lengthy experience in listening to midshipmen recite their lessons in naval history I should say that it is a rare student indeed who sees beyond the bare fact to the lesson or suggestion which the fact might convey to him. Naval history to the majority of students—and is not this true of too many of us who have passed beyond the schoolboy stage?—is theoretical because it ends in recitation or the mere reading. This is more or less true of almost any chapter in naval history that might be selected, but I am thinking in this connection of that fine old battle in the West Indies when Rodney beat De Grasse and in a moment of vigorous action shattered the traditions of a hundred years. What does the casual reader remember of that engagement? Mainly, besides the names of a few ships and a few ship commanders, the fact that the British admiral by a new maneuver broke up the French line of battle and won a great victory. But why should one strive to remember that fact? Is one any better off for memorizing it than he was before? Is a naval officer any better strategist or tactician or a more effective personality for having merely *read* an account of the battle of the Saints' Passage? I doubt it, unless Rodney's acts mean more to him than naval histories usually express. It is, however, the function of history mainly to tabulate and faithfully record; it is for the reader himself to scrutinize the facts as presented, to reflect and to feel their deeper significance, and every important action in the past has a meaning to the present beyond the mere statement, else it is as valueless as an unrelated date or a proper name. So it is, or should be, with the work of Rodney at the Saints' Passage. As a bit of by-gone tactics it is of no great value to-day, but as a lesson in personal courage, instant decision, and responsibility it is tremendous.

What was the situation? The majority of the readers of the PROCEEDINGS are perfectly familiar with it. Two great fleets were passing each other on opposite courses and at fairly close range, according to the gentlemanly way of conducting naval actions in the olden days. If nothing untoward had happened the two fleets would have passed each other completely, countermarched perhaps

and passed again, and yet again, or until each had been pummeled enough to cause it to be willing to retire with honors even, or until one had withdrawn with the other after it in an attempt to capture either it or stragglers from it. Owing, however, to the erratic action of the light wind a gap suddenly opened in the French line directly opposite to the English flagship, offering to Rodney the chance of a lifetime. But to seize the opportunity thus presented for concentration and for destroying the enemy in detail, meant to break his own orders still flying at the masthead, the "Fighting Instructions" of the British Admiralty, and a hundred years of tradition, which was perhaps as bad. Opportunity said, "Go." Everything else said: "Obey orders, maintain the line, hold fast to tradition."

It was no light thing in those days to obey the voice of opportunity. Originality and initiative were not encouraged then in the British Navy. To deviate from the "Fighting Instructions" meant a court-martial trial with the odds in favor of the court. To break tradition and after all to fail, meant ignominy and almost certain execution. The fate of Byng, it may be, flashed through Rodney's mind in that moment of destiny. A more commonplace officer at such a time, especially if advanced in years, would have played safe; he would have stuck to tradition, he would have maintained his line, and the battle of the Saints' Passage would have meant little or nothing to future generations. But Rodney was above the commonplace, or else he did in a moment of fine frenzy what he might not have done in a time of less excitement. Casting tradition, precedent, "Fighting Instructions," and all such hindrances to initiative by the board, he swept into the tempting gap and turned a dubious contest into a tremendous victory.

Such, in brief, was Rodney's operation at the Saints' Passage. Regarded as a mere episode it is striking enough, but when studied in its proper relation to the preceding events its reaction on the reader should be still greater. The battle was not an isolated engagement, but the culmination of a long campaign pursued with persistence but marked by no particular brilliance, no dashing action calculated to set one's blood afire. It had been a military game of hide and seek, of pursuit and escape, of long-range duels from which came no very satisfying results. Against this rather dull background Rodney's action shines with peculiar luster. It is said that there are moments in the lives of men—and is it not more so of military men?—big with destiny. If so, then ac-

cording as men have acquired the power of quick decision and the willingness to assume responsibility they have enshrined themselves in the pages of written history. Such a moment was Rodney's at the Saints' Passage, such was Farragut's at Mobile Bay, and such was Dewey's at Manila when he invited almost certain war with one of the greatest of European naval powers by an open display of American spunk. So it might be possible to continue and enumerate a long list of other such instances where the personal element was everything, instances perpetually reminding the reader that he too can make his life sublime.

Such actions on the part of men cannot be told too well or pondered too much, and it is a dull reader that, after perusing them, does not feel as never before the great value of initiative, of dash, and above all the willingness to assume the burden of responsibility. Naval history, therefore, should be studied quite as much, perhaps more so, for the personal inspiration as for the knowledge of the sequence of related facts or events. If one's reading of history, then, be it of naval operation or political movement, produces no mental stimulus or spiritual reaction, I say he has read in vain; he had better re-read, and in reading, reflect. There is such a thing as a philosophy of history, a philosophy of sea power, and it ought to be the aim of every historian to suggest it, of every teacher of history to expound it, and of every reader of history to feel it; otherwise the labor of all three is but vanity and vexation of spirit. The historian who writes without suggestion, the teacher who teaches without inspiring, the reader who reads without pondering,—each fails in his separate sphere.

It was Mahan who first saw the deeper significance in naval history. His philosophy of sea power in its quiet but solid way did more for the navies of the world than the more visible performances of some who have received greater acclaim. It was Mahan perhaps who first taught that historical study is practical because it ends in action. But it ends in action only when undertaken in a serious spirit and accompanied by a proper measure of reflection. Those who have caught this idea, who have learned to read naval history, not as they would scan the headlines of the morning paper or the pages of the latest novel, but as fraught with meaning and suggestion, cannot fail to attain unto a larger sphere of usefulness in their chosen profession. If this, too, was not the aim and the hope of Mahan then I have pored his pages over in vain.

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THE ECONOMIC DEVELOPMENT OF GUAM

By CAPTAIN ROY C. SMITH, U. S. Navy
Late Governor of Guam

Periodically there appears in the pages of the PROCEEDINGS an article on the possibilities of Guam. One of the last, and a most interesting and valuable article, was by Paymaster K. C. McIntosh, U. S. Navy, under the title of "War Provisions for Guam" (No. 162, March-April, 1916). It described the situation in Guam, under the Spaniards and under the Americans, and concluded that though the island could support, and had in former times supported a large population, agriculture had almost ceased to exist, on account of wages paid to laborers by the government and food shipped to the island by army transports. The wages enabled the natives to buy imported food, and the food shipped by the supply department for the American garrison lessened the local demand.

These causes still exist and are very deterrent in their effect. To them may be added the money received for copra, which enables the natives to buy imported food. Certainly there are no objections to copra as a money crop, *per se;* but economically it would be preferable under present conditions to grow food instead. Sufficient food first, then money crops, is a better principle.

The present article is not intended to deal with national policy, or with strategy. Whatever the future of Guam, the island should be cultivated to its full capacity. This will be true whether it is to be utilized as a naval base of the first order, or is simply to be administered for the benefit of its inhabitants. The soil in Guam is the only possible source of wealth. If cultivated it can support a large garrison, as well as the population; and such procedure will in any event result in prosperity and wealth to the island.

The food situation became very acute at one time last year, owing to interruptions in the transport service and a destructive typhoon that swept the island about the same time. Efforts had already been made to encourage production, but at this period it became apparent that something more than persuasion was necessary. It was a situation likely to recur and heroic measures were needed. An effort will now be made to describe some of these measures and their apparent effect in the brief time that has elapsed.

The population of Guam lives mostly in the towns, though almost every native family has a farm in the country, ranches as they are called there. These ranches are at varying distances from the towns, the most distant sometimes as far as ten or twelve miles. It had been the general custom of the natives to visit their ranches during daylight, on foot or by bull cart, returning to town in the evening. There was no realization that the time thus spent was a total loss. Time means nothing to Pacific islanders and the loss of nothing meant nothing.

Moreover, 60 per cent of the population of the island live in the one town of Agana; and probably three-fourths of these have no strictly town occupation, they merely live there. Under such conditions agriculture is at a minimum.

The population of the island is about 15,000, of whom about 14,000 are natives. There are about 3,000 able-bodied male natives between the ages of 16 and 60. Boys in Guam finish school and go to work at the age of 16. About 600 natives are employed steadily by the federal or island governments. Some 400 more are engaged in town occupations. This leaves about 2,000 for agriculture, without counting the women. The area of the island is something over 200 square miles, about half of which is suitable for crops or pasturage. This works out 32 acres per man for tilling or grazing. This would be far from excessive with modern methods and implements and the aid of the women. The actual present practice, though on the increase, is not a fraction of this amount.

Another deterrent to production is the lack of any storage facilities. Insects, moisture, vermin, typhoons, may quickly destroy any produce remaining over from current needs. It is even difficult to save seeds from one crop to the next. Some of the Spanish governors tried the experiment of providing granaries,

but it was not successful for one reason or another, probably premature.

Cattle, pigs, and poultry are food possibilities also. The cattle, though often stunted, seem to thrive when well cared for. They are sometimes bothered by ticks, but ticks can be controlled in one way or another. One trouble with the cattle was that castration was not generally practiced. The native was apt to pick out the larger and stronger animals for work, which resulted in leaving the runts for breeding. The result was what might have been expected. This has been corrected. Bulls for breeding are selected and registered. They pay no tax. All other bulls are taxed. Young bulls are castrated by the government free of charge. Only steers, oxen and barren cows are allowed to be killed for the market.

Pigs are generally in evidence, but they suffer from a number of diseases. The experiment station which the Department of Agriculture maintains in Guam is studying these and other diseases of animals and will in time find the remedies. Their conclusions and remedies are at the disposal of all the inhabitants.

All kinds of poultry are found on the island. The matter of increasing the production is one of care and attention. Heretofore rats have destroyed many of the eggs. Cock-fighting is harmful, for biological reasons. The native saves his roosters for fighting and eats the hens. The reverse practice would be better for production. A campaign against cock-fighting is in progress. It will die hard, as it is the one absorbing amusement of the natives, dating back into Spanish times. It also brings revenue to the island government. But it is probably doomed.

The sanitary condition of the island is a factor in production. Since the American occupation this has much improved. There is a special annual appropriation under the Navy Department that is available for sanitary purposes. It amounted to $14,000 until a couple of years ago when it was increased to $20,000. Leprosy has practically disappeared. If a case is found it is at once transferred to the leper colony at Culion in the Philippines. The most serious present difficulty is intestinal and other parasites. Such large numbers of natives have in times past lived in such restricted areas, and do still for that matter, without adequate sanitary provisions, that the soil is infested with parasites. Hookworms are the most dangerous, though there are other varieties.

There are two remedies, education and the adoption of sanitary provisions and measures.

Through the interest of the Bureau of Medicine and Surgery and of the Rockefeller Foundation of New York, Dr. John B. Grant, of the International Health Board of that foundation, spent a month on the island last year examining local conditions from the standpoint of the board's work in other localities. He found that soil infestation was wide-spread, principally in the towns. The percentage of hookworm infection among the natives was 72, of a light to moderate character. His recommendations were that the sanitary orders already in effect should be strictly enforced, and that the proposed improvements should be carried out as rapidly as funds should be available. This was gratifying to the authorities. Money is the greatest need.

Communications play a large part in production. Bull cart roads and trails were the only means until a few years ago. Under the Americans, improved roads have gradually appeared until now there are about 75 miles. This is not nearly enough, as many parts of the island still cannot be reached.

There were no markets until very recently, excepting a small market for the white population. This is partly explained by the lack of communications. But in addition, the native knew nothing of specialized labor. He made or grew everything he needed for his own use and gave away the surplus, if any. Even trade and barter were little practiced.

Vermin also were a great deterrent. Rats simply swarmed. There were thousands of them. They ate nearly everything green, also seeds, in and out of the ground, and destroyed the eggs of wild birds and fowls. A large lizard, called locally iguana, also did much damage, principally to the eggs and young of birds and fowls.

Rather a formidable list of obstacles to overcome before production could be made to reach a reasonable figure. But the attempt could at least be made, and has in fact been made, and with results that are far from discouraging.

One of the first measures was to go after the rats and iguanas. All the available literature on rat campaigns was examined. As a result, the bounty system was selected as the most suitable. The island government has paid, on the average, two cents a head for rats and ten cents a head for iguanas since the fall of

1916. The children have become the principal rat-catchers. They accomplish it mostly with home-made bamboo traps, or snares. Sometimes they dig out nests of rats from their holes in the ground. Iguanas are hunted with dog and gun.

In a period of 29 months, from September, 1916, to February, 1919, the total number of rats destroyed has been 1,783,937; iguanas 51,516; and the cost to the government has been $43,674.71. This seems a large expenditure, but as a matter of fact the cost has gone right back to the people in bounties, whereas the gain has been immense. Estimating the damage at five cents a rat per month, which is the lowest estimate of rat damage to be found anywhere, and the average time gained per rat killed at 14½ months, the total damage saved amounts to about $1,300,000. The actual diminution in the number of rats and in the loss sustained is very noticeable. Iguanas have practically disappeared. Birds have increased largely. Animal ticks have decreased. It is thought the birds eat them. The cattle thereby profit. Damage to poultry is almost negligible; and lastly, agriculture has become possible. So far as known, and in relation to the area involved, there has been no rat campaign on a scale approaching this one.

There is sometimes question of discontinuing the bounty, due to lack of revenue. This would be suicidal, unless an equal number of rats can be destroyed by some other method. There may be loss of revenue, but there is no loss of money to the people. Every other expenditure should be abandoned rather than this. To discontinue now, when the battle is largely won, would be, for the reason that rats breed so rapidly, to revert in a few months to the former situation, which was intolerable; and the whole effort up to now would be lost.[1]

The next matter to be taken up was markets. There had been for a long time a small market where the surplus from the government gardens and farms was disposed of to the families of officers and other Americans. About two years ago it was decided to try to do something in this direction for the natives. A small market-house was built by the island government and opened as a weekly market on Saturdays for the benefit of the natives. All farmers were urged to send produce to this market. In this

[1] Since the above was written bounties have been discontinued and all male inhabitants over 16 are now required to bring in a certain number of rats. A prize competition has also been instituted.

they were assisted by the government trucks and the station tug. This market, though not a financial success at first, grew in importance, and eventually, last year, two larger buildings were constructed, one for a meat and fish market, and the other for vegetables and fruits. It was discovered that excellent fish weirs, inside the reefs, could be made with chicken wire and would outlast other forms of weirs. By these means an abundance of fish was secured. The markets have quite demonstrated their usefulness, have helped to stimulate production, and when there are more roads and better means of transportation they will be indispensable.

The next measure was an annual industrial and agricultural fair. This takes place in Agana in the week of July 4 and lasts about three days. There have been two so far. (Spring of 1919.) They are much of the nature of our county fairs. There are prizes for the best displays of every variety. The island government is now arranging to buy all the desirable industrial exhibits and sell them later in a government store. In addition to the exhibits there are military and civil parades, sports and games, eatables and drinkables (soft), and amusements of all descriptions. The fair has become a fixture. The committee is now busily at work arranging for the third exhibition. The influence of the fair is very marked. The mere gathering of the people, as well as the introduction of the competitive element, and the prizes themselves, stimulate production to a marked extent.

In the above measures great assistance was rendered by the insular patrol. This is an organization that has grown from small beginnings. Three years ago it consisted of 12 non-commissioned officers and privates detailed from the marine garrison. Their duties are partly military and partly constabulary. They report on roads, trails, bridges, landing places, defense positions, water supply, sanitation, food, damage by rats, bird-life, animal ticks, agriculture, crops, fishing. They also prevent violations of forestry laws, liquor laws, game laws and damage by stray cattle. They have charge of the military training of the natives. Their numbers have gradually increased, owing to the extent of their work and the wide variety of their duties. They numbered about 60 in the summer of 1918, after prohibition went into effect, and after the great destruction wrought by the typhoon of July 6 of that year, when it was necessary to put forth every

effort to increase agricultural production. The members are selected from the marine garrison of over 400 for intelligence, character, military qualities and knowledge of country life.

It is thus seen that the duties of this organization, while partly military, are also largely civil, the performance of which might be to the detriment of the military efficiency of the garrison. But on any alarm they return at once to their regular station, and they go through all the firing practices with their companies. After all, the duties of the whole naval personnel in Guam are in the main civil. The naval station exists in name only, as it has no facilities for supplying or repairing ships. The principal duty of the naval personnel is to conduct the "Naval Government of Guam," which is the official title of the government. The members of the insular patrol are thus carrying out their principal duty, and they are in effect the most useful and valuable organization on the island.

Universal military training has existed in Guam for over two years, or since March 15, 1917, prior to the entry of the United States into the world war. This movement was described in the NAVAL INSTITUTE PROCEEDINGS, No. 187, September, 1918. Briefly, instruction begins with the school children. The boys assemble four mornings in the week before school, and have three-quarters of an hour drill under the insular patrol. The exercises are Swedish movements and the simple military movements without arms. At the age of 16 they finish school and join the Guam Militia. Service in the active militia continues until the age of 23, when they pass into the reserve.

The movement has been most successful. There are practically no requests for exemptions. The force is uniformed, armed, equipped, they have their own native band and carry the new island flag, recently designed, along with the national colors. In addition to their rifles they have the 4-inch battery and machine guns of the late German ship *Cormoran*. The active militia numbers about 1,000. The reserve will in time number as many, or more. This figure of the active militia represents 7 per cent of the native population. The same figure in the United States would mean 7,000,000, or more, uniformed, armed and equipped troops. The Guam Militia has lately been taken over officially by the Navy Department and is now an organized force under control of the United States.

This movement is doing much for the island. The effect on the physical and mental development of the young natives is already marked. The discipline and training received in the militia should increase their efficiency as citizens manyfold.

The importance of road-making is now recognized. Congress has included lately a modest annual appropriation for that purpose. Highways have been planned eventually to cover the island, surveys for which are in progress. The usual cutting, blasting, and filling are required, also a number of concrete and steel bridges. Decayed coral, or *cascajo*, as it is called locally, forms the usual roadbed; but it washes rather badly in the rainy season, and it will not stand heavy hauling. *Tarvia* is being tried as a binder, but for the main roads there will have to be some form of macadam, or bituminous macadam. With good roads agriculture will be greatly stimulated.

The matter of taxes, and their proper incidence, has been the subject of much consideration. The island government is supported by its own revenue. The federal government appropriates for the naval station and garrison, and helps with schooling, and incidentally with sanitation, water systems and roads. The sources of the island revenue are the tariff, internal revenue, and taxes. Prohibition cut off a large part of the tariff revenue. Of course the island has as much money as before, plus what would have been spent on liquor. The problem is to get some of it in the shape of taxes. One of the largest items of expense is the rat bounty. But this means nothing economically, for the money goes right back to the people; and the island is vastly richer by the decrease in depredation of the rats. There is a different distribution of this money, but it goes finally to people who have well earned it; and those who do not earn any of it are in a position to stand the expense.

Taxes should be laid as much as possible to promote desirable objects and to discourage practices that are undesirable. The most desirable object is to increase agriculture. Second only to that is the improvement of the sanitary conditions in the towns, as already related. The conditions in the towns would be much improved if about two-thirds of the inhabitants would move into the country. This would also help agriculture. This points to a low tax rate for the country and a higher rate for the towns. Hence in the revision of the taxes after prohibition became

effective, the country taxes were not increased, except as necessary to provide for the rat bounty. But, as already explained, that can all be recovered and is recovered. The town taxes were very materially increased. However, about 43 per cent of these taxes were set aside for sanitary and other improvements in the towns in which collected. These improvements are absolutely needed, and if the people insist on congregating in the towns they must expect to pay the necessary expense. Sanitary, and other regulations in the towns, apart from taxes, include suitable cubical air space per occupant of dwelling houses, suitable stables or shelters for horses and cattle, pigs not allowed in towns, proper spacing of houses, suitable methods of construction, and suitable sewer connections or sanitary toilets.

The present tax rate on real estate for all the above purposes is 3½ per cent in the towns and 3 per cent in the country. The present average price of unimproved land is $4 an acre. Hence the tax is 12 cents per annum per acre. This is nothing if the land is used. It may easily be recovered by catching rats. Also, there is a bounty of 20 cents an acre for all cultivated land. The rates could evidently be materially increased in both town and country without hardship. They may have to be increased to provide needed revenue. But if the relative rates are maintained agriculture must thrive, the towns can be made sanitary, and harmful parasites will be eliminated.

In connection with sanitation is the question of suitable quarters in suitable sites for the naval garrison. Irrespective of the location of the future naval station the needs of the present garrison are to be considered. Two of the three companies of marines are quartered at Sumay, which is a healthful and agreeable situation, where breezes are to be found most of the time. Some of the enlisted men of the navy and marine corps are quartered at Piti and Asan, where the accommodations are adequate and the situation good. The rest of the garrison, the officers and their families are at Agana, the capital. This will always be the site of the civil government and the residence of the officers and enlisted men of the navy and marine corps who help in any way with the "Naval Government of Guam."

Agana is a town of 9,000 inhabitants on a low flat stretch of coast land six to eight feet above sea level. Immediately back of the town are hills 150 to 200 feet high that cut off all the breeze

in the hot season. The town is densely built and over-crowded. The soil is infested with parasites. The governor and the commanding officer of marines are provided with government quarters on the plaza, where is also a dilapidated and inadequate old Spanish building used as marine barracks. The rest of the officers of the navy and marine corps and their families find quarters where possible in town, without regard to locality, and in close proximity to houses of natives. This situation is most unsatisfactory for the health and comfort of this personnel, and particularly of the women and children. It should never have been allowed to exist during the 20 and more years of the American occupation.

On the hills back of the town are plateaus, half to three-quarters of a mile wide, at elevations of 150 to 200 feet, with unpolluted soil, and breezes most of the time. Preliminary plans have been prepared for moving the officers and their families and the marines to these plateaus. The site is practically ideal. A sheer cliff on the sea side extends for half its length. There will not only be room for quarters and gardens, but also for administration and amusement buildings, parade ground, baseball and tennis grounds, a golf course and a large maneuver field. The land is already owned or is being purchased by the government. Finally, the site and general plan have been favorably reported on by the Bureau of Medicine and Surgery, the Bureau of Yards and Docks, Marine Corps Headquarters, the Office of Naval Operations, and have now been officially approved by the Navy Department. An appropriation by Congress is next in order, when a most desirable and long-deferred measure will be possible of accomplishment.

The final great measure of reform came as a sequel to a destructive typhoon that swept the island on July 6, 1918, by which the growing crops were practically ruined, fruit and coconut trees uprooted or stripped, and most of the food on the island not in government storehouses badly damaged or destroyed. The army transport service was interrupted about the same time, owing to exigencies of the war, and the island was nearly helpless in the matter of food. Appeals by cable and radio produced little effect, as there were no vessels available; but finally a collier arrived from Manila with 875,000 pounds of rice alone. This helped the immediate situation. The local Red Cross had looked out for the urgent needs of the destitute. No appeal was made for money, only for food. The island was not self-sustaining and had no reserve supplies.

Hence, as a measure of self-preservation, an order was issued on August 23, 1918, requiring every able-bodied male inhabitant between the ages of 16 and 60, not otherwise fully engaged in some useful occupation, to give his whole time, or his whole unoccupied time, to agriculture or the raising of cattle, food animals or poultry. This was under penalty of vagrancy, a law for which already existed. This order affected about 2,000 persons, as stated in an earlier paragraph.

The execution of the order was entrusted to the insular patrol, lately much increased, as already related, to enforce the liquor law. These men were stationed in all parts of the island, in twos and threes, and were in intimate contact with the inhabitants. A census had already been taken by them of the inhabitants by district, the amount of land owned, the amount under cultivation, those without land but available for agricultural work, together with other useful information.

The first step was to require the ranchers to remain on their ranches, instead of going to town every night, no matter what the distance, with consequent loss of time. If the distance was less than three miles they were still allowed to go in; over that distance they could go in only for Saturday and Sunday. This requirement was very unpopular at the start, but the faithful marines accomplished it in time with a very small amount of friction. The amount to be cultivated by each inhabitant is set at present at five acres. This amount can be increased in time, with modern implements, and the help of the women.

The next step was to introduce a more effective method of labor. The inhabitants were divided into groups by districts, with group leaders. The groups worked on each other's ranches in rotation, completing the tour from Monday to Friday inclusive. This left Saturday and Sunday free, for such use as each individual saw fit. This method proved popular and effective. A man could loaf alone on his own ranch, but not when working in a group on his neighbor's ranch. The new governor reported, February 27, 1919, "there is perhaps the largest crop of corn, sweet potatoes and other food stuffs ever known, owing to a compulsory labor law put in effect after the typhoon. With few exceptions the people have plenty to eat and wear and these few cases are cared for by our charity fund. The people as a rule are poor but generally seem able to pay their taxes." This is certainly

encouraging for the future. The island can thrive if the inhabitants once learn the value of labor. They have sometimes been called lazy. They are not lazy when they are interested. They are often idle, when they see no object in working. So are other people.

Damage from typhoons is always to be considered. Destructive typhoons are fortunately rare. In the intervals the natives forget and the Americans change. Certain conclusions are to be drawn, which have been made a matter of record. They should be kept in mind and followed.

The old Spanish structures suffered least. They were an evolution of two centuries. The walls were thick and the houses low, not over two stories. This was partly to resist earthquakes, which sometimes occur. The roofs were of tiles. The eaves did not project far and there were fillets underneath to shed the wind. There were few porches and few projections for wind lodgments. Where damage occurred to these structures it was mostly in changes made by the Americans, as in the galvanized iron roofs, with overhanging eaves, which often blew away.

The bungalow type of houses, with wide porches, is unsuited. The porches sometimes blow off; and if they have an iron roof in common with the house the whole roof is apt to go. Two new houses of this character were lifted from their foundations and dropped gently a few feet away while partly wind borne.

The native houses, generally of wood on piles, with thatched roof, were mostly unroofed and sometimes blown down. It has been the custom in times past to lash down these houses with ropes of bark, passing over the roof and set up like tent guys. This is a good practice to continue and would probably save many of the houses.

Growing crops generally and trees must take the blast, but the crops can be a good deal sheltered by windbreaks. There are several hardy shrubs on the island that grow rapidly and form dense hedges. They have been utilized to a limited extent in the past, but not nearly enough. Rules making them obligatory in effect could be devised and are in fact necessary. The labor involved is slight, and the hedges would largely take the place of fences, which are neded to keep out cattle and which are expensive. The hedges would afford considerable shelter to growing crops.

Apart from the effect of typhoons, seeds are with difficulty saved

from one crop to the next. Moisture, vermin and insects soon make an end of them. Air-tight, water-proof, fire-proof, and rat-proof bins are needed for the seeds alone. Typhoon-proof granaries of the same character as the bins are needed to store the surplus crops. Owing to the absence of any storage facilities there has been no inducement in the past to grow more than necessary for current needs.

Food by transport for the garrison has had the same effect in minimizing the incentive to production, as pointed out in Paymaster McIntosh's article; only the evil has grown worse. During the last fiscal year (1917-18) the cost of this food was $216,000. The freight charges were $19,600 and losses by survey $1,400. The total cost was thus $237,000. The garrison comprises about 500. Adding the families of officers and other Americans and the enlisted natives having commissary privileges would bring up the total to about 1,000 persons. Hence the average per person is about $20 a month. This amount for raw food in the tropics is entirely absurd. The greater part of the articles involved are grown or raised on the island at the present time, though not in sufficient quantities. Nearly all could be provided locally. Some few articles are not grown in the tropics. At one time recently, as a mere example of current practice, there were 10,000 tins of string beans in the commissary store; and string beans, the best in the world, grow in Guam every day in the year. This situation is well known to the Department, but no method has yet been devised for correcting it. Government stock and agricultural farms would be the solution, but existing appropriations are not available for such use.

There is however a method of stimulating production for which fortunately there is now an encouraging prospect. A great trouble with the natives is lack of capital. With capital they could obtain modern farm implements and machinery and could build granaries for surplus crops. The method of rural credits seemed a partial solution; and, after the recent typhoon, this was recommended to the Department. As a result there is a provision in the appropriation bill that recently failed, and which will without doubt be included in the next bill, that reads as follows:

> For rehabilitating the island of Guam on account of typhoon of July 6, 1918, to be paid to and expended in the discretion of the Governor of Guam, including the preservation from the weather, vermin, and insects of surplus crops and seed, the purchase of farming implements and farm

machinery for use in and upon such public lands on the island of Guam as may be available and for rental thereof to natives desiring to utilize same, and for extending credits to native farmers, $50,000.[1]

This sum was intended to be deposited in the Bank of Guam, which is a branch of the Island Treasury, at interest, and used as indicated. It is capable of accomplishing much good. The amount stated is small and will need renewal.

The measures described are feasible and are doing much to improve the economic conditions of the island. The effect should be to break up the idle congregation of the population in the capital town of Agana and to distribute them throughout the island. In this the development of roads will be of great assistance. Schools and churches should follow in the rural districts. The clergy can help in this, as the natives are very religious and heed the admonitions of their spiritual advisers. The best of relations exist between the church authorities and the island government, and the priests and clergy in their sermons do much to help the policies of the governor. The natives are mostly Roman Catholics, with a Spanish bishop and priests, Capuchins of the Franciscan order. There is also a Protestant mission, which, though small, exerts an influence in the same direction.

While the tax rates are small compared with other communities, there are naturally objectors. While few in numbers they are relatively influential. Such are holders of idle lands, money lenders, speculators, sharpers, and in general all who do little themselves for the community and thrive on the credulity of their more ignorant neighbors. They are not influenced by the consideration that the increased wealth of the island will be to their advantage as well. They should be given small attention.

Generally speaking, the natives are learning fast. Their schooling gives them a start. Next, universal military training has more influence for good than all other measures. The markets and annual fairs add to the stimulus. The enforcement of sanitary measures is having an effect which though slow is certain; and lastly the back to the farm movement is giving them a direct object lesson in the results of industry.

A time will come when there will be exports for the foreign market. This is limited at present to copra, which is shipped in occasional American or Japanese schooners. No steamer lines

[1] This provision was unfortunately crossed out of the bill that finally passed.

stop in Guam, which is unfortunate, for a possible commerce is the greatest inducement to production. The well-to-do natives have had in mind the starting of a schooner line to Manila. The Philippine tariff on Guam products was revoked last year, which offers an inducement for such a line. It could no doubt be made to pay; but while there is sufficient capital, the natives have no initiative or organizing capacity. They have had no way to learn.

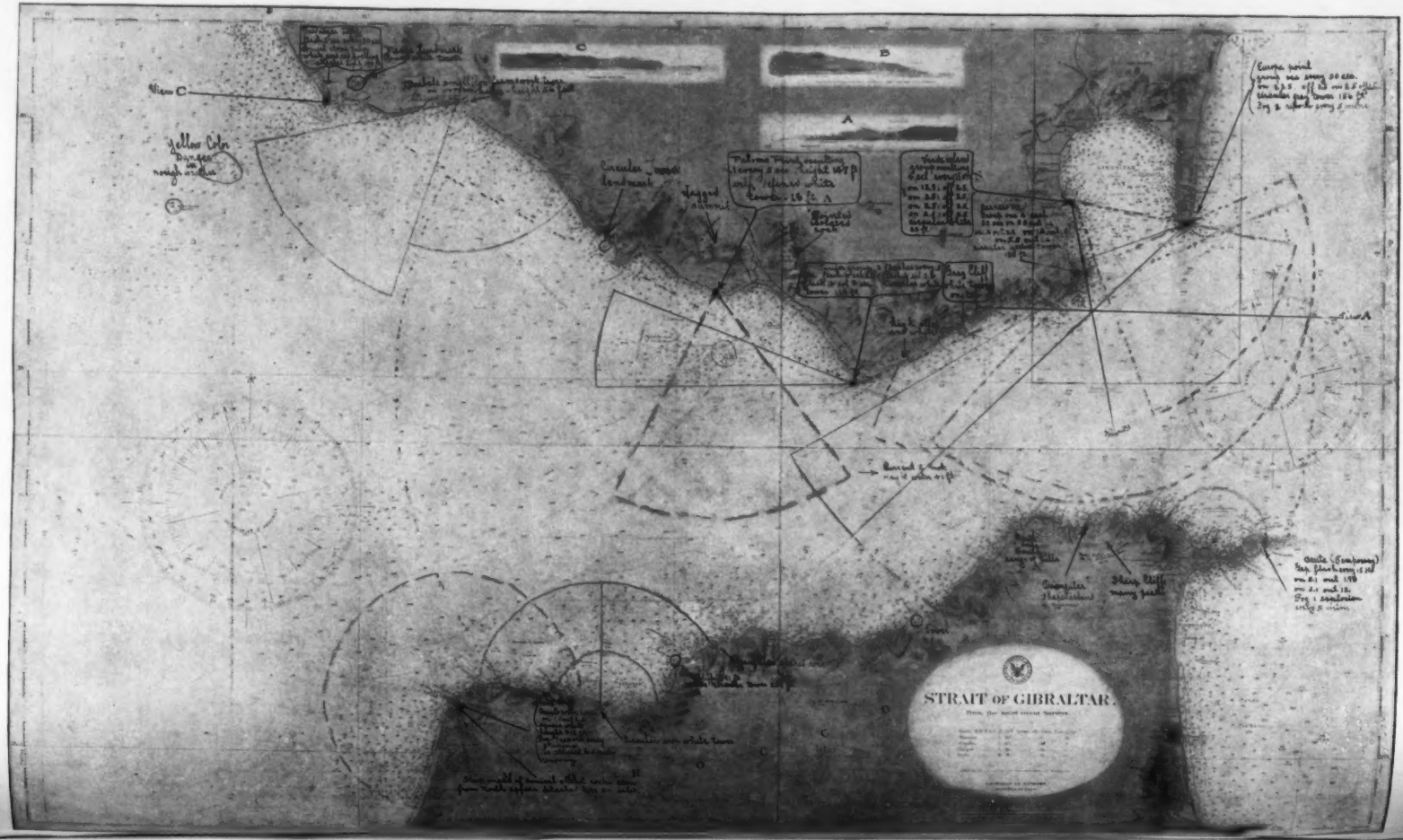
The former station ship made quarterly health and commercial trips to Japan, China, and the Philippines. She was taken away during the war and has not been returned as yet. These trips were of the greatest value in many ways, not the least of which was the stimulation of commerce, and indirectly of production. She should be returned directly, as no work she is now engaged in can be any more important than her services in Guam.[1]

While copra is established, and has many advantages as a money crop, there are many other possibilities. Coffee is one of the most promising. It thrives in all localities on the island, and with a minimum of care. It is also of a very high grade. Not all the berries grown are even picked at present, but only enough for current use. Were there a market the yield could be largely increased. Lemons also are a possibility. They are of an excellent quality and would sell readily in Manila. These few items are mentioned, but almost all varieties of tropical fruits and vegetables grow in Guam.

Of possible industries, basketry and weaving are beginning to take a prominent place. There have been two teachers on the island for a couple of years, loaned by the Philippine department of education, who have stimulated much interest in this direction, as also in lace making. There are many native fibers on the island which supply unlimited material for these industries.

In conclusion, it may be said that Guam can be made self-sustaining, and can in fact support a much larger population than exists at present on the island. And the measures now in effect, modified from time to time as necessary, and supplemented by such wise provisions as experience may dictate, will certainly produce the desired result. It will then be possible to utilize Guam in such way as may appear desirable, or to leave it to the peaceful enjoyment of its own inhabitants, undismayed by typhoons and the absence of imported food.

[1] Her return has been ordered.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U. S. NAVAL INSTITUTE, ANNAPOLIS, MD.

CHART STUDY AND PREPARATION

By LIEUT. COMMANDER R. R. MANN, U. S. Navy

Officers spend much time in perfecting themselves in deep sea navigation where the ship is not endangered, but do not always acquire the maximum knowledge available before piloting into port where the danger really exists. Recent courts-martial have proven this fault. To gain this knowledge it is necessary to study all data possible and the best method of study is to work on the charts themselves, preparing them for use. A very simple method of chart preparation, and therefore study, used with success on the Asiatic Station and in the Mediterranean in entering unfamiliar ports is here described.

1st. Be sure that all navigational books and charts are correct to date by the latest hydrographic bulletins and notices to mariners.

2d. Look up chart catalogue and pick out all charts for that vicinity which can possibly be of use.

3d. Mark the landfall chart (smallest scale) No. 1, the next to be used No. 2, the next No. 3, etc., down to the largest scale chart which will necessarily be the harbor chart.

4th. On No. 1 chart draw a rectangle, preferably in blue pencil, showing the limits of No. 2 chart. On No. 2 chart draw a rectangle showing the limits of No. 3 chart, etc., down to the largest scale chart. Mark the rectangle with the number corresponding to that chart for reference. The charts are now numbered consecutively so the next largest scale chart available can be immediately used when the ship's position comes into that rectangle.

5th. Now look up light lists and check radius of visibility of lights with radius given on the chart. With a compass draw circles of visibility adding distance the light itself, not the glare, can be seen due to your own height over 15 feet as indicated in Table 14, Bowditch.

6th. Next lay off sectors of visibility through which lights can be seen as given by the light lists, keeping in mind the heights of

hills and objects in range and that the bearings are given as observed from sea.

7th. Color light-houses, circles of visibility and sectors of lights with colored pencils using red for red, green for green and yellow for white. A satisfactory scheme for quick identification is:

For a fixed light, color the whole visible segment of the circumference.

For a flashing light, make dots with large spaces on the circumference.

For an occulting light, make long dashes with small spaces.

For a group flashing light, make a group of dots then a space.

For alternate red and white flash, alternate colors of the dots.

8th. Note in pencil by each light the following information as obtained from the light lists: characteristic appearance of the light-house, fog signals, submarine signals and intervals of flashes so the light can be checked with a stop watch.

9th. Color all buoys and beacons with their respective colors but remember that a buoy is often out of place and should be considered more as a warning than an infallible navigation mark. Rely on ranges and bearings of known landmarks.

10th. From information in the sailing directions mark on the chart in pencil any conspicuous and prominent hills or objects so they can be readily identified as landmarks.

11th. Look up the coast and geodetic survey tide tables and find the state of the tide for the time the chart is to be used, not forgetting that the times given are for high and low water and not turns of the current or slack water.

12th. If advisable trace line of depth next greater to the ship's draft and any mine areas, wrecks or shoals to be avoided preferably with a red pencil.

13th. Remember the following are unreliable: sound signals in a fog, unwatched lights and buoys and charts that have become distorted by dampness.

The example given is No. 2 chart entering Gibraltar from the Atlantic.

The advantage of this system is that all data available from all sources of information is concentrated on the chart in plain view.

A navigator who makes these simple chart preparations once will be astonished at the knowledge and confidence acquired.

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U. S. NAVAL INSTITUTE, ANNAPOLIS, MD.

A HANDY GUIDE TO THE NAVAL HISTORY OF THE WORLD WAR, 1914 TO 1918, AS FOUND IN THE UNITED STATES NAVAL INSTITUTE PROCEEDINGS, ESPECIALLY THE NAVAL WAR NOTES

By WALTER B. NORRIS, Associate Professor of English, United States Naval Academy

The following guide to the part played by the navies in the World War from 1914 to 1918 includes only what is found in the NAVAL INSTITUTE PROCEEDINGS, especially the Naval War Notes, on the chief events of the war. Insignificant skirmishes have been omitted, but a wealth of material—official reports, newspaper accounts, personal narratives, and contemporary discussions—has been discovered and rendered accessible to the reader. American matters have been rather exhaustively dealt with, and every ship which engaged in actual fight with an enemy has been included as far as the PROCEEDINGS extend. Wherever articles in the body of the magazine furnish historical data, as, for instance, von Mücke's story of the *Emden*, translated by Lieut. Klein, they have been noticed, as well as all illustrations of value. The table of losses of ships by all belligerents found in the PROCEEDINGS for July, 1918, is complete to that date and is continued in later issues as losses occurred.

Aboukir, Cressy, and Hogue
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Agassiz, captured as raider—May 1918, 1155-6.

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Alcedo
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Sunk—Dec. 1917, 3030-1.

Antilles
Sunk—Dec. 1917, 3025-7.
Photo—Dec. 1917, 3026.

Aquila, attacks Austrian destroyers and planes—Nov. 1917, 2733-4.

Arethusa, see Helgoland, also Mar. 1916, 652; May 1916, 1048-9.

Armenia, torpedoed but beached—Mar. 1918, 690.

Ayesha
Von Mücke's story—Nov. 1916, 1871-88; Jan. 1917, 43-72; Feb. 1917, 255-86.
Drawing of ship—Nov. 1916, 1871.
Photo of Von Mücke—Jan. 1917, 43.
Photo of arrival of crew at Constantinople—Feb. 1917, 255.

Aztec, sunk, Gresham's story—June 1917, 1324 ff.

Baltic Sea (see also Riga)
Engagement of July 2, 1915—July 1915, 1367-9.
Pommern sunk—Sept. 1915, 1734.
British submarines in, 1915—Nov. 1915, 2133-6.

Beatty, Sir David—Sept. 1914, 1856-63; Mar. 1915, 633 ff.; Jan. 1917, 142.

Belgian Prince
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Similar crimes—Nov. 1917, 2754.

Borinquen, attacked by submarine—Apr. 1918, 917; May 1918, 1148.

Breslau, see *Goeben.*

British naval policy
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Digging-out—Oct. 1917, 2383-7; 2387-9, 2390; Nov. 1917, 2702-4; May 1918, 1129-30; Sept. 1917, 2115-8.

British Navy, strength in 1914 (Pollen)—Apr. 1919, 703-4.

Broke-Swift destroyer action, April 20, 1917—June 1917, 1316-19.

Buck, Frank H (ship), sinks submarine—Oct. 1918, 2463-4; Dec. 1918, 2858.

Campana, fought submarine—Sept. 1917, 2124.

Capitals in War Time, Four (T. S. Wilkinson)—Jan. 1915, 71-9.

Cassin, attacked by submarine—Dec. 1917, 3028.

Cattegat, engagement of Nov. 17, 1917—Jan. 1918, 169-70.

Central Africa, capture of German steamer—Sept. 1917, 2136-9.

Chincha drives off submarine—June 1918, 1393.

Chronology of War—Jan. 1919, 141-5.

Cormoran
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Blown up by crew—May 1917, 1078-9.

Coronel
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Diagrams, etc.—Jan. 1915, 271-6.
Von Spee's report—Sept. 1915, 1757-9.
Admiral Cradock—Jan. 1915, 186.
Summary of Pollen—April 1919, 704.

Covington, sunk—Aug. 1918, 1933.

Cradock, Sir Christopher, see Coronel.

Cressy, see *Aboukir*.

Cudahy, sunk—Oct. 1918, 2460.

Cuxhaven, raid on, Dec. 25, 1914—Jan. 1915, 256-7.

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MINUTES OF THE ANNUAL MEETING, 1919

U. S. NAVAL ACADEMY, ANNAPOLIS, MD.,
OCTOBER 10, 1919.

In accordance with Article V, Section I of the Constitution, two week's notice having been given, the annual meeting was held in the Board Room of the Officers' Mess.

Captain W. T. Cluverius, U. S. Navy, Chairman of the Board of Control, presided.

The minutes of the last meeting were read and approved.

The first and stated business being the election of officers, the following tellers reported the vote, having been appointed by the President 10 days previous—

Commander A. P. Fairfield, U. S. Navy.
Commander C. M. Austin, U. S. Navy.
Commander B. R. Ware, U. S. Navy.

The tellers reported the results of the election as follows:

For President

Rear Admiral B. A. Fiske, U. S. N.	611
Rear Admiral Ralph Earle, U. S. N.	325

For Secretary and Treasurer

Commander S. A. Taffinder, U. S. N.	644
Commander R. A. Theobald, U. S. N.	284

For Board of Control

Captain W. T. Cluverius, U. S. N.	791
Captain E. J. King, U. S. N.	703
Captain T. L. Johnson, U. S. N.	650
Captain W. G. DuBose	579
Captain Amon Bronson	372
Commander B. C. Allen	325
Lieut. Colonel J. W. Wadleigh, U. S. M. C.	305
Commander Thomas Withers, U. S. N.	252
Captain Charles Conard (PC), U. S. N.	231
Commander A. A. Corwin, U. S. N.	218
Commander C. R. Hyatt, U. S. N.	196

Commander A. S. Kibbee, U. S. N.	184
Commander H. K. Hewitt, U. S. N.	184
Commander I. C. Bogart, U. S. N.	134
Commander G. H. Bowdey, U. S. N.	133
Commander G. P. Auld (SC), U. S. N.	117
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For Secretary and Treasurer	3
For Board of Control	30

A. P. FAIRFIELD, Commander, U. S. Navy.
C. M. AUSTIN, Commander, U. S. Navy.
B. R. WARE, Commander, U. S. Navy.

The following officers were then declared elected:

President

Rear Admiral B. A. Fiske, U. S. Navy.

Secretary and Treasurer

Commander S. A. Taffinder, U. S. Navy.

Board of Control

Captain W. T. Cluverius, U. S. Navy.
Captain E. J. King, U. S. Navy.
Captain T. L. Johnson, U. S. Navy.
Captain W. G. DuBose (CC), U. S. Navy.
Captain Amon Bronson, U. S. Navy.
Captain B. C. Allen, U. S. Navy.

The following motion was passed:

Resolved, That it be the sense of the meeting that the Constitution be amended by presenting the matter to the membership as required by the Constitution, changing the words "two dollars and fifty cents" to "three dollars" in Article VII, Section 8, making the section read:

"The annual dues for regular and associate members shall be three dollars, all of which shall be for a year's subscription to the UNITED STATES NAVAL INSTITUTE PROCEEDINGS, payable upon joining the Institute and upon the first day of each succeeding January."

During discussion it was explained that the necessity for this amendment is that the cost of paper has more than doubled in the last year and that the cost of the PROCEEDINGS has increased 36 per cent. The loss in publishing the PROCEEDINGS now amounts to about $10,000 to $12,000 annually, the loss being made up by the Book Department of the Institute. This last increase will make the annual loss on the PROCEEDINGS about $16,000 to $18,000. In

order to partly take care of this loss this amendment is proposed. The Secretary was unanimously authorized to present the amendment for the consideration of the membership.

The Secretary and Treasurer presented his annual report as follows:

1. In the history of the Naval Institute the period from December, 1917, to July of this year has been the most prosperous, due to the expansion of the Navy and the government contracts for service books, which the Book Department of the Institute filled.

2. The increase in membership, however, was not in proportion to the increase in business. The present circulation of the INSTITUTE PROCEEDINGS as of October 1, 1919, is 6460 copies, divided as follows:

Honorary members	4
Life members	139
Regular members	4934
Associate members	510
Subscribers	798
Exchanges	32
Advertisers	43

which shows a slight gain in membership over the previous year.

3. Since the commencement of the monthly issues, the PROCEEDINGS have been published at a yearly loss of approximately from $10,000 and $12,000, which has been borne by the Book Department.

4. During the last year increased cost of paper and press work will bring the annual loss, due to this item, to about $16,000 to $18,000. It is believed that this fact is not realized by the membership at large. If the annual dues are raised to $3.00 this will take care of part of the last increase in the cost of the publication of the PROCEEDINGS.

5. Constant efforts are being made to increase the advertisements carried in the PROCEEDINGS, and the revenue now realized from this source amounts to $3600 per annum, an increase of approximately $1500.

6. A new system was inaugurated in January of this year in connection with the financial condition of the Institute, a statement being prepared and submitted to the Board of Control at each monthly meeting.

7. The net worth of the Institute reached its highest point in August of this year, at which time it was $183,736.65.

The report of the Secretary and Treasurer was adopted.

There being no further business the meeting adjourned at 8.15 p. m.

S. A. TAFFINDER,
Commander, U. S. Navy,
Secretary and Treasurer.

U. S. NAVAL INSTITUTE

SECRETARY'S NOTES

Membership

Life, regular and associate membership, 5649. New members: 4. Resignations: 5. Dropped: 1. Deaths (1).

Rear Admiral E. C. Pendleton, U. S. N.

Dues

It is requested that all members who have not paid their dues up to and including 1919, do so before the annual audit, January 1, 1920.

Regular and associate members of the U. S. Naval Institute are subject to the payment of the annual dues until the date of the receipt of their resignation.

Address of Members

All members are urged to keep the Secretary and Treasurer informed of the address to which PROCEEDINGS *are to be sent, and thus insure their receipt.* Members and subscribers are urged to notify the Secretary and Treasurer promptly of the non-receipt of PROCEEDINGS, in order that tracers may be started. The issue is completed by the 15th of each month.

Book Department

The Institute Book Department will supply any obtainable book, of any kind, at retail price, postage prepaid. The trouble saved the purchaser through having one source of supply for all books, should be considered. The cost will not be greater and sometimes less than when obtained from dealers.

Reprints of Articles

The attention of authors of articles is called to the fact that the cost to them of reprints other than the usual number furnished, can be greatly reduced if the reprints are struck off while the article is in press. They are requested to notify the Secretary and Treasurer of the number of reprints desired when the article is submitted. Twenty copies of reprints are furnished authors free of charge.

Illustrations Authors of articles submitted are urged to furnish with their manuscript any illustrations they may have in their possession for such articles. The Institute will gladly co-operate in obtaining such illustrations as may be suggested by authors.

Original photographs of objects and events which may be of interest to our readers are also desired, and members who have opportunities to obtain such photographs are requested to secure them for the Institute.

Notice Whole Nos. 6, 7, 10, 13, 14, 15, 17, 145, 146, 147, 149, 155 and 179 of the PROCEEDINGS are exhausted; there are so many calls for single copies of these numbers that the Institute offers to pay for copies thereof returned in good condition at the rate of 75 cents per copy.

ANNAPOLIS, MD., OCTOBER 15, 1919.

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PROFESSIONAL NOTES

PREPARED BY

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GENERAL ARRANGEMENT

VESSELS BUILDING.
NAVAL POLICY.
MATÉRIEL.
PERSONNEL.
OPERATIONS.
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France 1907
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FRANCE

THE FRENCH BATTLESHIPS.—At the beginning of the war there were five battleships on the stocks in France, all of the same type with a displacement of 25,200 tons and capable of steaming at a maximum speed of 21 knots. Four of them—the *Flandre, Gascogne, Normandie,* and *Languedoc*—were launched during the first few months of the hostilities, but their armament was suspended on account of the arsenals being engaged upon the production of guns and munitions. The turrets built for the *Gascogne* fell into the hands of the Germans. The fifth battleship, *Béarn,* has remained on the stocks ever since, and is still uncompleted. The question now arises whether these vessels should be equipped or abandoned and their cost put to the profit and loss account. The ships were to have been fitted with three quadruple turrets to receive twelve 340 mm. guns, and the thickness of the armor at the water line is 320 mm. Even at the time the four were launched they were inferior to the then latest foreign battleships, and now they are of course hopelessly outclassed. Owing to the heavily increased price of materials, the cost of completing the ships would far exceed the original estimates, and as their value as fighting units has enormously depreciated, there is a general opinion that the battleships should be scrapped. There is also a great deal of difficulty in preparing a new program of naval constructions, for, apart from the heavy building cost at the present time, it is feared that with the existing price of coal it would not be possible to keep the ships at sea. There is no desire to build up a powerful navy if the ships are to remain permanently in harbor. It is admitted that the French navy is "passing through a serious crisis," and it will be interesting to see what solution is offered when the Government presents its program of naval construction.—*The Engineer,* Sept. 15, 1919.

RECENT CONSTRUCTION AT THE ROCHEFORT ARSENAL.—The large 830-ton submarine, the *Laplace,* the last of a series of six similar boats, was successfully launched August 12. The other five boats of this class are: the *Joëssel,* just commissioned at Cherbourg, and the *Fulton* recently launched here; the *Lagrange, Regnault,* and *Q-114,* built at Toulon. These are slightly

modified reproductions of the *Dupuy-de-Lome* and the *Sané*, built at Toulon in 1916, which performed good service on the Moroccan coast during the war.

Besides building numerous "cannonieres" for submarine hunting, the Rochefort has finished since 1914, the submarines *Chlorinde* and *Cornelie*, the large destroyers *Mecanicien-Principal-Lestin* and *Enseigne-Roux*, the submarines *Amphitrite*, *Astree* and *Bellone*, with Sabathe 2-cycle engines. —*Journal de la Marine*, Aug. 23, 1919.

NEW SCHOOL FOR OFFICERS AT BREST.—It has been decided to create a school at Brest for the purpose of "finishing those young officers whose courses at the Naval School were cut short on account of the war. All the ensigns who were admitted to the Naval School or the School for Student Officers since 1913, except those now actually in one of those schools, will take the new course. The course will last six months, with two sessions a year. It will probably open November 15.—*Journal de la Marine*, Aug. 23, 1919.

THE CRUISE OF THE "ALDEBARAN."—Under the command of Lieutenant Guierre, the sloop *Aldebaran* sailed August 20, (from Toulon) for a cruise in the Indian Ocean and the Pacific, for radio experimental work. The utilization of this type of vessel solves the problem of small cruisers for distant stations, the lack of which was keenly felt before the war. More than one young officer will envy his comrades of the *Aldebaran*, far away from the constraints of fleets. Ports of call will be plentiful. Among them: Djibouti, (our colony on the Somali coast, port of Abyssinia), the Seychelles, Diego-Suarez, (the Brest of Madagascar), Colombo, Batavia, Freemantle, Melbourne, Auckland, Noumea, (New Caledonia) and Papeete (Tahiti).—*Journal de la Marine*, Aug. 23, 1919.

HOW SOME OF THE FRENCH SUBMARINES WERE LOST.—1. The *Curie* left Brindisi December 17, 1914, for the purpose of entering Pola harbor to torpedo Austrian capital ships. She fouled the chains of the harbor barricade, and could not extricate herself. The boat became inclined 30 degrees, the storage batteries spilled, short circuits occurred and the air became unbreathable. Seeing all hope of saving the boat gone, the captain had all tanks blown, and managed to come to the surface, to be greeted by gunfire from the waiting Austrian vessels. The captain was wounded and his second was killed beside him, and several men were wounded. Before coming on deck the valves were opened and the boat soon sank. The captain would have gone down with her but was saved by a quartermaster in spite of himself. All the survivors were picked up. The captain later died as a result of his wounds. The *Curie* was subsequently raised and used by the Austrians.

2. December 4, 1915, the *Fresnel*, on patrol off the Albanian coast, went aground near the mouth of the Bojana. All attempts to float her were unsuccessful. An Austrian hydroplane saw the submarine at daylight, and sent news of her to several enemy torpedo boats, which soon arrived on the scene. The *Fresnel* was heroically defended, but after receiving several vital hits, it was decided to abandon ship. In four trips of the small boat all the officers and crew were landed on a small islet. An attempt was made to send the small boat to the mainland a mile away to get asistance, but she was attacked, a man killed, the others wounded, and she drifted until picked up by the *Novarra*. The men on the islet were attacked by rifle and machine gun-fire and after a sharp battle the captain decided not to prolong a useless resistance, and surrendered. The commanding officer was court martialed after being returned to France, and was acquitted.

3. At 2 a. m., December 29, 1915, the *Monge* was cruising about 15 miles south of Cattaro, when several enemy ships were seen. She submerged to attack, when a terrible shock was felt—she had been rammed by the cruiser

Heligoland, which had not been seen so close. The conning-tower plates were ruptured and water poured in. The safety hatch was immediately closed. But the submarine, inclining more and more, sank very quickly. At 60 meters (197 feet) an attempt was made to come up. At this moment, with an inclination of 30 degrees, the batteries spilled, and all lights went out. The crew, thinking themselves lost, cried "*Vive la France!*" However, she succeeded in arriving at the surface. She was a beautiful target, illuminated by searchlights of the enemy warships, and was soon hulled, causing her to sink a second time. The captain now decided to try to save as much life as possible. All tanks were blown, and the forward hatch, the only one out of water, was opened, all of the crew came out in good order, the enemy ceased fire, and their boats picked up the survivors, while the *Monge* sank for the last time, taking with her the captain, Lieut. Morillot.

4. September 15, 1916, in clear weather, off Cattaro, the *Foucault* was attacked by three hydroplanes. The explosions, though violent, did little damage to the hull, but a small stuffing box in the motor compartment was carried away, a stream of water fell on the motors, causing a short circuit, and the lights went out. A fire in the insulation of the cables started. The forced submerging continued, the steering motors having failed. She was finally brought up at 75 meters (246 feet). The hull resisted well at this depth, but a great deal of water was coming in. The captain was very cool and collected. He blew the after tanks to regain proper trim, then the central tanks to rise to 25 meters (82 feet) where they stayed, endeavoring to repair the damage, and to plug up the hole. But nothing could be done, not a single pump functioned, and so the boat was brought to the surface. The hydroplanes were beaten off, but not being able to start the engines, and knowing that Austrian vessels would soon be on the spot, it was decided to destroy the boat. A bomb was set to explode at 15 meters—this functioned, and the officers and crew were later picked up by Austrian torpedo craft. The commanding officer was acquitted by the court held after he was returned to France.—*Journal de la Marine*, Aug. 23, 1919.

THE FRENCH ARMY.—On the ratification of the Peace Treaty with Germany by the French Parliament, which is expected to take place this week or next, the French Army will be placed on a peace footing and will occupy its peace garrisons, with the exception of the troops detailed for holding the left bank of the Rhine. By October 4, at the latest, demobilization will have been completed, and only re-engaged men and the 1918 and 1919 classes of conscripts will be remaining with the Colors. But Class 1920 is due to be called up on October 1, and the foregoing numbers, together with contingents from the African and Colonial armies should, it is calculated, bring the total of the French Army on a peace footing to 750,000 men. This total would allow of a detachment of 75,000 men for the left bank of the Rhine, but Class 1920 will require at least three months' instruction before being fit for duty.—*The Army and Navy Gazette*, Sept. 6, 1919.

GREAT BRITAIN

DRASTIC DISARMAMENT.—Great Britain is reducing her navy in a most drastic way. Since the war she has sold or condemned over 150 ships, and the most amazing part of this disarmament is the fact that it includes every one of her big fleet of predreadnoughts. She has retained the *Lord Nelson* and the *Agamemnon*, presumably on the ground that their armament of four 12-inch and ten 9.2-inch guns puts them in the semi-dreadnought class.

The sweeping character of this disarmament affords food for thought by our Navy Department which is asking Congress for funds to bring our own predreadnoughts into fighting shape. With the single exception of the *Hood*, Great Britain has stopped work on all capital ships, that is, on all battleships and battle cruisers. We, ourselves, on the other hand, have six battleships and six battle cruisers under construction.

Dispatches report that the First Lord of the Admiralty is endeavoring to cut the present expenditures in half. The future navy is to include only dreadnoughts, battle cruisers, light cruisers, destroyers and submarines. All other ships are to be ruthlessly scrapped. Although all the capital ships that were under construction during the war including the *Anson*, *Howe* and the *Rodney*, 42,000-ton ships, sisters of the *Hood*, that were building at the end of the war, have been discontinued, 36 of the smaller vessels, scout cruisers, destroyers and submarines will be completed.—*Scientific American*, Sept. 27, 1919.

ACTIVE BRITISH FLEET SMALLER THAN OURS.—In an article in *The Daily Telegraph* on the peace reduction of the British Navy, Archibald Hurd says:

"It is an arresting fact that, judged by the strength of its battle squadrons in active commission, this country's supremacy has at least temporarily passed away. The United States has now in commission 31 battleships and the Navy Department at Washington plans to have 29 next year, that reduction in number being balanced by the increased power of a number of ships now being completed in the shipyards. We have in a similar state of readiness 22 battleships and five cruisers, and in accordance with the order published yesterday with reference to the reduction to the reserve basis—that is, care and maintenance parties—of the majority of the ships of the home fleet our instantly ready battle force will fall at an early date to 16, 10 of them forming the Atlantic fleet and the other six cruising in the Mediterranean—16, as compared with 29 under the Stars and Stripes.

"That comparison between the sea standing of the British and American fleets now and in the immediate future is not of much importance judged from the political or the naval point of view, but it is of interest. I doubt whether at any period during the last two or three hundred years the British fleet ever approached, much less has fallen below, an equality with any other power in its standard of commissionings, and we used to aim at a two-power standard."—*N. Y. Times*, Sept. 12, 1919.

BRITISH DESTROYER SUNK.—The Secretary of the Admiralty announces that H. M. destroyer *Vittoria* was fired at and sunk by torpedo in the Baltic on August 30, the ship sinking in five minutes. Two ratings are slightly wounded and eight are missing, believed drowned.

The *Vittoria* was a new destroyer, completed by Messrs. Swan, Hunter & Co. as recently as last year. She embodied the experience of the war and was of large displacement—about 1300 tons. Her length was 300 feet, and she had a beam of 29½ feet in association with a draft of 8 feet 10 inches. She developed 27,000 shaft horse power, and had a speed of no less than 34 knots. Her armament consisted of four 4-inch quickfiring guns, with one 3-inch anti-aircraft gun, and she was pierced for four torpedo tubes. Carrying normally about 367 tons of oil, the *Vittoria* had a large radius of action. —*The Army and Navy Gazette*, Sept. 6, 1919.

REDUCING THE BRITISH NAVY.—The need for strict economy in maintaining the British Navy in the future, in order that over-zealous economists in Parliament may not in reducing expenses allow the navy to decline below the minimum compatible with bare safety, is urged by the *London Engineer*. The German Navy, our British contemporary points out, has practically disappeared; Russia is not likely to become a first-class sea power for many years; and France and Italy will not spend money on large naval programs. This, it is held, removes all doubt as to the stability of Great Britain's maritime position in Europe.

"Nor for many years," says the *Engineer*, "is that position likely to be affected in other quarters of the world by the naval activity of the United States and Japan, which alone among the powers are continuing to build capital ships. In brief, our supremacy in every class of fighting tonnage is so great that no serious risk would be incurred if we suspended construction

altogether for a few years. That being so, the Admiralty, we fear, will find it difficult to explain to Parliament why it determined to complete 84 of the warships which were on hand when hostilities ended.

"In ordinary circumstances we should rejoice at the worthy manner in which it is proposed to display the flag in every part of the navigable globe, not from motives of chauvinism, but because we recognize the commercial and political benefits that flow from such a policy. But the present circumstances are extraordinary, and we doubt whether the country is in either the position or the mood to sanction the disbursement of a penny for which no direct return can be guaranteed. In respect of matériel there are methods by which the efficiency of the fleet can be not only maintained but increased without the heavy outlay entailed by new construction. The lines of technical development are clearly indicated by war experience. The possibilities of long-range gunnery have not yet been fully explored, neither has there been time to assimilate the lessons we have learned in regard to the best system of protection against gunfire and submarine attack. Ordnance experts tell us that if the guns in our ships had been able to fire at an elevation of 25 or 30 degrees, instead of at only 15 degrees, we should on several occasions have inflicted more damage on the enemy. It is known, too, that Germany secured excellent results with her elongated shells and with the reliable fuse fitted to her armor-piercing projectiles. Moreover, she possessed a marked advantage by reason of the superior mechanical efficiency of her torpedoes and mines. It is careful attention to these technical minutiæ that prepare the ground for decisive results in war, and research work of this kind is not so expensive as new construction.—*Army and Navy Journal*, Sept. 27, 1919.

BRITISH NAVY REORGANIZATION.—According to a dispatch from London, "the campaign for administrative economy is gaining momentum daily." Great Britain must make a sweeping reduction in expenditures and practice thrift in little things as well as great, or she will find it hard to meet her obligations. Mr. Lloyd George has sounded the warning, and where can a beginning be made so effectively as in the navy? The menace of the German fleet is ancient history now, and the empire has nothing to fear from any existing navy, militantly or politically. Her dreadnought line of battle is so strong that the United States would have to build steadily for several years to equal it if not a rivet were driven in British yards, and the United States is a friendly nation, prospectively an ally to keep the peace of the world. Compared with Great Britain, France and Japan are second class sea powers; necessity as well as sympathy and mutual interest bind France to her loyal ally with hooks of steel, and with Japan Great Britain has a hard and fast alliance. Aside from the fair promise of the League of Nations, Great Britain is now in a position to call a halt upon the expansion of her navy and to reorganize it on an economical basis.

The British Navy, like our own for that matter, is topheavy. It includes pre-dreadnoughts that are obsolete and can be broken up; many of the British cruisers and lighter craft are little better than junk for either offense or defense. The pre-war complement would be much too large for the navy after desirable elimination of ships. Mr. Walter Long, First Lord of the Admiralty, calculates that naval appropriations can be cut from £140,000,000 to £70,000,000. The plan is to have no ship in the service that is not a fighting ship of the first class, according to type. While work on 42 vessels has been stopped or canceled, 36 others, presumably light cruisers, destroyers, and submarines, are to be finished, but plants in the yards are to be kept up for an emergency.

This is a sane as well as a saving policy, and if red tape could be swept like cobwebs out of Admiralty halls, the British Navy should lose nothing in efficiency by the reorganization; but, of course, it will be necessary to put able and energetic men in the highest positions. Admiral Sir Percy Scott, who by the way insists that the naval lesson of the war is that large

battleships are an incumbrance, being of no use in the presence of well-handled submarines, has recently told the story of the unreadiness of the British Navy for the war with Germany, because no more than "10 ships of the whole fleet had their main armament fitted for director firing," a neglect that was due to stolid satisfaction with the old method. At the battle of Jutland, Sir John Jellicoe had only six ships fitted with a complete system of director firing, secondary as well as main batteries, and not a cruiser was among them. Furthermore, according to Sir Percy Scott, the German guns had the longer range in many cases. But perhaps the worst ineptitude of the Admiralty in 1914 was the belief that a battleship would be in no serious danger from an enemy submarine. So long as Baron Fisher was in authority the navy was progressive, and it is significant that his voice is now loudest for the plan of reducing the fleet to first-class fighting ships and adding no others.—*N. Y. Times,* Sept. 5, 1919.

AUSTRALIA TO HAVE FLEET.—Admiral Jellicoe's world tour of the various dominions comprising the British Empire has resulted in a report on Australia's future naval policy which indicates a wide expansion of the empire's imperial naval policy. A copyrighted dispatch of the *Philadelphia Public Ledger's* cable service states that Admiral Jellicoe's report has been forwarded to the government at Sydney, Australia, and warns that country "that she must cease playing with naval defense and take the subject seriously." The dispatch continues:

"In accordance with the Admiralty's redisposition of the fleets in the Pacific, Admiral Jellicoe finally scraps the former policy of the British Navy with subordinate local fleets and submits a scheme providing for a real imperial naval whose future under a unified command is dependent upon the continuous expansion of the dominion navies, on a standardization plan common to all. In other words, Admiral Jellicoe suggests that Australia may accept the responsibilities which are the inseparable aims of recognition as a nation.

"The present system of administration is condemned, while the personnel of the commonwealth's naval board is considered unsatisfactory because it lacks the practical service and knowledge necessary to provide an adequate base for the fleet at Sydney. It is not impossible therefore that another station will be required, and the Garson Island adjuncts may be sold for other purposes in order to attract officers and men. Admiral Jellicoe recommends salaries and wages closely approximating the opportunities of landsmen."—*Army and Navy Journal,* Sept. 9, 1919.

THE REVIVAL OF THE AMERICAN "MONITOR."—An unexpected naval development was the reappearance, during the war, of the *Monitor* type of our Civil War days. Of course, in the 50 years or more that intervened between the two great struggles, there had been a great development in the principles and practice of naval architecture, all of which was available to the British naval constructors when they adopted the principle of the monitor and applied it to modern conditions. Consequently, in the British monitors, we notice a great increase in size, free-board, sea-keeping qualities and offensive power.

Strictly speaking it is stretching the point somewhat to call the 6650-ton *Marshal Ney* a monitor, inasmuch as she lacks the essential quality of low free-board. In this respect the Italian monitor, *Fra di Bruno,* which is described as a great armored raft for carrying heavy guns, is more strictly in the *Monitor* class.

Monitors of the past war were built for seacoast work, and this was done in the North Sea mainly against the German batteries on the Belgian coast, and in the various operations against the Turks at the Dardanelles. In the case of the Italian Navy they were used for coastal work in the Adriatic. The British built 16 sea-going monitors and 18 river monitors. The sea-going monitors ran, in size, from 1260 tons to 8000 tons and the

river monitors had about 575 tons displacement. The armor protection, in the case of the sea-going monitors, consisted of belts of from 2″ to 6″, associated with 2″ protective decks and 4″ bulk-heads, while the gun positions carried armor of from 10.8″ to 13.8″.

The armament consisted, in the main battery of two guns, varying from 12″ to 15″ in caliber, and carried always in a single 2-gun turret. The speed in the majority of these vessels was 6.5 knots, but in the 1260-ton *Merseys* and in the 8000-ton *Erubus* and *Terror* the speed was 12 knots. The earlier river monitors mounted one 9.5″ gun and the others two 6-inch. Their speed was 12 and 10 knots.

For the purposes for which they were used on the Belgian and Dardanelles coasts, a valuable feature of these monitors was their light draft, which was only 5′ 8″ in the *Mersey* class of 1260 tons and 10′ in the *Marshal Ney* and other monitors of from 6000 to 6700 tons. This enabled the vessels to operate in the shoal waters which lie off the Belgian coast and in certain parts of the Adriatic.

The Italian monitor *Fra di Bruno* was one of the five ships, the others being the *Carso, Cucco, Monfalcone* and the *Vodice*. They were built, as we said, of raft-like form, and their low free-board and limited draft rendered them suited for work in the shoal waters at the mouth of the Piave River. They operated here in excellent concealment, and their powerful long-range 15″ guns were of great assistance in checking the Austrian advance after the break through at Caporetto.

The monitor has always been considered as a strictly defensive vessel for operation along one's own coast-line and for cooperation with the forts in the protection of harbors and roadsteads. It is among the many surprises of the war that they should have been used in very strenuous offensive operations, in some cases at a great distance from their home ports. This, of course, was rendered possible only by the fact that Great Britain, and the Allies in general, had the command of the sea.—*Scientific American*, Sept. 27, 1919.

SEA AND HOME SERVICE DEFINED.—The Admiralty announce that, for purposes of drafting, service is to be divided into two classes, viz.:

1. *Sea.*—Service in all sea-going fleets and squadrons, except ships of the home fleet other than torpedo craft; flotilla leaders, destroyers, torpedo-boats and submarines, and spare crews appropriated to submarines; sea-going submarine depot ships; seagoing destroyer depot ships and repair ships attached to the Atlantic fleet; vessels employed on fishery duties; and harbor ships and establishments abroad.

2. *Home.*—Service in ships of the home fleet, other than torpedo craft; harbor ships and establishments at home and their tenders; depot ships for torpedo craft in home waters, except the seagoing destroyer depot ships attached to the Atlantic fleet; non-seagoing depot ships and bases for submarines; and in stationary ships at home and their tenders, other than vessels employed on fishery duties.

Men proceeding in a ship of war from home to sea service, or *vice versa*, and the nucleus crew of a ship of war employed in conveying relief crews, are to count the period of absence as sea service. So far as the requirements of the fleet will admit, service in all harbor ships and establishments and their tenders, including stationary ships, will be for two years.—*The Army and Navy Gazette*, Sept. 6, 1919.

SCAPA FLOW NOT BRITISH.—It will come as a surprise to many people to learn that the Orkney Islands, which include the great naval station of Scapa Flow, do not really belong to Great Britain in the sense that they were ever ceded by treaty or acquired by conquest. They were simply transferred by Denmark to Scotland in 1468 in pledge for the payment of the dowry of the Princess of Denmark, who was married to James III, King of Scotland.

In the deed of transfer, which is still in existence, it is especially mentioned that Denmark shall have the right to redeem them at any future time by paying the original amount of the dowry with interest to date. There is no likelihood, however, that Denmark will ever attempt to exercise her Right of Redemption, because 60,000 florins, the original amount of the dowry, would amount to perhaps several thousands of millions of pounds sterling—and that is a bit more than the islands are worth.

When the islands were given as security for the Princess's dowry, there is reason to believe that it was intended to redeem the pledge, because it was then stipulated that the Norse system of government and the law of St. Olaf should continue to be observed in Orkney and Shetland. Thus the udal succession and mode of land tenure (that is, absolute freehold, as distinguished from feudal tenure) still obtain to some extent, and the remaining udallers hold their lands and pass them on without written title.—*The Nautical Gazette*, Sept. 6, 1919.

A YEAR IN THE FLEET.—Just as they had concluded their midsummer leave and were on the point of starting on their cruises to the seaside resorts, *en route* to the northern bases, the ships of the Atlantic and home fleets were notified of the new arrangements which have been approved for regulating the work and play of officers and men throughout the year. The Admiralty have displayed posters on the ships giving an outline program of their prospective movements, with other information of great importance and interest, not only to those on board but to their families and friends.

From this program it is possible for an officer or man in the ordinary course of events to know in advance where he will be stationed at a given time, what amount of leave he is entitled to during the year, and from which port it will be given, and where his ship will have her periodical dockings and refits. This is a new departure and is made possible by the present international situation and the elimination of the German fleet. It could hardly have been done in the same way before the war, since it would have advertised the period during which our main fleets were at their maximum state of unreadiness. That it is given now is another indication of the care and consideration of the authorities for the interests and well-being of the ships' companies. The information in the new posters may be divided into three categories: That which concerns the movements of the fleets; the bases allotted to the various squadrons for exercising, manning, docking, etc.; and the important question of leave.

The outline program of movements shows that the custom inaugurated when Lord Selborne was First Lord in 1904-5 of bringing the squadrons together in February and October each year for combined exercises will be continued. From mid-December to mid-January is the winter leave period for the fleets, but in February and March they will carry out drills and exercises, which will be followed in April by the granting of the spring leave. From May to July inclusive the Atlantic and home fleets visit their northern bases, carrying out practices and exercises. Naval maneuvers will be the climax of this period of training, after which the fleets' regatta will be held. August will be given up to the midsummer leave period, and for the three following months, while the Atlantic fleet cruises around Great Britain and Ireland and returns to the northern bases for drills, exercises and experimental work, the home fleet carries out drills and exercises from Portland. It will be remembered that the February meetings for exercises started when Sir Arthur Wilson was commander-in-chief of the Channel fleet, were usually held off Lagos, and, although no locality is mentioned in the new plans, possibly the two fleets will again proceed to the portuguese coast for a similar purpose. Moreover, just as it was arranged in Lord Selborne's Memorandum of December 6, 1904, that the Atlantic fleet should come under the orders of the commander-in-chief of the Channel fleet, (then the premier force) once a year for combined exercises, so it is now laid down by the Admiralty that from May to July inclusive the home fleet shall come

under the orders of the commander-in-chief of the Atlantic fleet for the exercises which culminate in the summer maneuvers.

There is naturally, on the other hand, a great change to be noted in the plans now approved in regard to the bases of the two main fleets. Rosyth has been sufficiently developed during the war to be chief base of the battleships, battle cruisers, light cruisers and flying squadron of the Atlantic fleet, and also of the 1st submarine flotilla. The 2d and 3d submarine flotillas will be stationed at Devonport and Portsmouth respectively, while all the destroyers of the fleet will have their headquarters at Port Edgar. In the south Portland becomes a much more important base than it was during the war. All the ships of the home fleet will be stationed there and will give their spring and midsummer leave from this base, proceeding to their manning ports only to give Christmas leave. Invergordon and Scapa bases only, for the Atlantic fleet ships throughout the year and for the home fleet ships temporarily during the summer months. Perhaps the most remarkable feature of the future use of the various bases is the manner in which the three older yards at Portsmouth, Devonport and Chatham fall out of the list, so far as the Atlantic and home fleets are concerned. Except as manning ports, they are hardly mentioned in the new schedule. All the heavy ships in the fleets are to carry out their annual refits and dock at Invergordon or Rosyth; so are the seaplane carriers and the home fleet light cruisers. An exception is made in the case of the Atlantic fleet light cruisers, which will dock at Chatham. Only a few torpedo craft will refit at the manning ports, as the majority of these vessels will be accommodated at Invergordon or Rosyth. These arrangements are indicative of the manner in which during hostilities the Grand fleet ceased to be dependent upon the yards in the south. The facilities provided at the Scottish bases are of such a nature as to be able easily to cope with the reduced number of ships in the Atlantic and home fleets. Thus it comes about that battleships and light cruisers of the home fleet, stationed at Portland all the year round except for the midsummer cruise to the north, are to be sent to Invergordon or Rosyth for their refits. Except for the few torpedo craft, the southern yards are left entirely free for ships in reserve, and the reconditioning of merchantmen.

Leave arrangements must no doubt have proved the most absorbing topic to the majority of those who read the new schedule. An interesting experiment is to be tried of abolishing week-end leave in the Atlantic fleet, except when the ships are at their home or refitting ports, and of increasing, by way of compensation, the annual period of long leave from 28 to 42 days, to be given in three periods of 14 days each. A strong advocate of week-end leave was Admiral Lord Beresford, who described in his "Memoirs" how he altered the duration of this leave, from after dinner on Saturday to seven a. m. on Monday, and extended it from after dinner on Friday to noon on Monday. As Mr. Lionel Yexley pointed out in one of his books, Lord Beresford's interpretation of such leave was an extreme one, as "when the fleet was at its base at Portland, he made arrangements with the railway people for special trains, and granted leave each week-end from noon Friday to noon the following Monday, thus practically demobilizing his command for four days out of each week." Other admirals, of course, had very different views on this vexed question, and from the standpoints of the men themselves and the efficiency of the service, it is well that the Admiralty have laid down a definite line of policy which seems to have hit off a happy mean. Progressive training should benefit from the reduction in the amount of week-end leave, and the handsome compensation of 14 days' long leave will, no doubt, be satisfactory to most officers and men. On the other hand, the board recognize the hardship in keeping full crews on board ships while they are in their home ports or refitting, and in these leave from noon Saturday to noon Monday is approved. On the whole, the Admiralty deserve the thanks of the personnel for their sound-minded policy.—*The Army and Navy Gazette*, Sept. 6, 1919.

UNITED STATES

NAVY DEPARTMENT—BUREAU OF CONSTRUCTION AND REPAIR

VESSELS UNDER CONSTRUCTION, UNITED STATES NAVY—DEGREE OF COMPLETION, AS REPORTED SEPTEMBER 30, 1919

Type, number and name	Contractor	Per cent of completion			
		Oct. 1, 1919		Sept. 1, 1919	
		Total	On ship	Total	On ship
Battleships					
43 Tennessee	New York Navy Yard	87.9	83.4	85.2	80.7
44 California	Mare Island Navy Yard	76.5	68.6	72.2	64.2
45 Colorado	New York S. B. Co.	32.5	13.2	30.1	10.3
46 Maryland	Newport News S. B. & D. D. Co.	54.3	46.5	53.	44.5
47 Washington	New York S. B. Co.	31.2	11.8	29.5	9.6
48 West Virginia	Newport News S. B. & D. D. Co.	26 3	2.5	25.1	2.2
49 South Dakota	New York Navy Yard	0.	0.	0.	0.
50 Indiana	New York Navy Yard	0.	0.	0.	0.
51 Montana	Mare Island Navy Yard	0.	0.	0.	0.
52 North Carolina	Norfolk Navy Yard	0.	0.	0.	0.
53 Iowa	Newport News S. B. & D. D. Co.	0.	0.	0.	0.
54 Massachusetts	Fore River S. B. Co.	0.	0.	0.	0.
Battle Cruisers					
1 Lexington	Fore River S. B. Co.	0.	0.	....	....
2 Constellation	Newport News S. B. & D. D. Co.	0.	0.	....	....
3 Saratoga	New York S. B. Co.	0.	0.	....	....
4 Ranger	Newport News S. B. & D. D. Co.	0.	0.	....	....
5 Constitution	Phila. Navy Yard	0.	0.	....	....
6 United States	Phila. Navy Yard	0.	0.	....	....
Scout Cruisers					
4	Todd D. D. & Const. Co.	32.	10.6	30.7	9.1
5	Todd D. D. & Const. Co.	29.	8.9	28.2	7.1
6	Todd D. D. & Const. Co.	23.8	1.8	23.3	1.6
7	Beth. S. B. Co. (Fore River)	0.	0.	0.	0.
8	Beth. S. B. Co. (Fore River)	0.	0.	0.	0.
9	Wm. Cramp & Sons Co.	16.	....	15.	....
10	Wm. Cramp & Sons Co.	16.	....	15.	....
11	Wm. Cramp & Sons Co.	5.	....	4.	....
12	Wm. Cramp & Sons Co.	5.	....	4.	....
13	Wm. Cramp & Sons Co.	5.	....	4.	....
Miscellaneous					
Fuel Ship No. 16, Brazos	Boston Navy Yard	98.8	98.7	98.6	98.5
Fuel Ship No. 17, Neches	Boston Navy Yard	33.4	23.1	30.	19.
Fuel Ship No. 18, Pecos	Boston Navy Yard	16.7	.2	6.2	.2
Gunboat No. 21, Asheville	Charleston Navy Yard	98.6	95.6	94.7	89.7
Gunboat No. 22, Asheville	Charleston Navy Yard	6.5	5.5	6.5	5.
Hospital Ship No. 1, Relief	Phila. Navy Yard	53.5	48.5	46.8	41.4
Amm. Ship No. 1, Pyro	Puget Sound Navy Yard	97.	93.	95.	90.
Amm. Ship No. 2, Nitro	Puget Sound Navy Yard	68.	54.	63.	48.
Rep. Ship No. 1, Medusa	Puget Sound Navy Yard	7.	0.	1.	0.
Destroyer Tender No. 3, Dobbin	Phila. Navy Yard	1.3	5.	0.	0.

There are 136 destroyers, 58 submarines, 6 mine sweepers, 14 seagoing tugs, 7 harbor tugs, 11 oil tankers and 8 Ford eagles in various stages of completion.

There were completed and delivered to the Navy Department during the month of August 12 destroyers, 2 submarines, 1 mine sweeper, 4 seagoing tugs, 9 harbor tugs, 1 oil tanker and 23 Ford eagles.

There are in addition 12 destroyers and 16 submarines authorized, but not under construction or contract. Miscellaneous vessels authorized but not under construction or contract (3): 1 submarine tender No. 3, 1 destroyer tender No. 4 and 1 transport No. 2.

NAVAL POLICY

WARSHIPS TO HAVE SEAPLANES.—Every American warship of the first and second class is to be equipped with a seaplane, it was learned at the Navy Department, September 13. This is to even up with progress already made by Great Britain.

This policy, with the corelative one of building a great fleet of dirigibles, is directly in line with the views of the naval war experts as to defense "in the next war."

They say the time has passed when a direct attack on sea coast cities like New York or Boston may be made by a battleship fleet, however powerful. The attack will be by seaplane, launched from a moving base of dreadnoughts at sea, navy officers assert. Hence the plan, now announced, to converting land planes into working seaplanes to be assigned to each of the larger ships.—*Aerial Age Weekly*, Sept. 22, 1919.

THE COAST GUARD.—The Coast Guard, which was placed under the jurisdiction of the Navy Department during the war, has been transferred back to the Treasury Department by President Wilson. Merchant marine and commercial interests asked for the change, while the Navy Department desired to retain jurisdiction.—*Shipping*, Sept. 13, 1919.

MORE MARINES FOR THE PACIFIC COAST.—Marine corps forces on the Pacific coast are to be augmented as a result of the creation of the Pacific fleet. Brig. Gen. Joseph Pendleton has been ordered to San Diego to establish the second Marine corps advanced base headquarters there. The force at San Diego will be increased from about 250 men to a full brigade. Complete equipment, including aviation and artillery material, will be kept in readiness, and the marine units at Mare Island and Bremerton will be absorbed into the brigade at San Diego. General Pendleton served two years in command of marines in Santo Domingo and acted as military governor there. He has had considerable previous service on the Pacific coast.—*N. Y. Times*, Sept. 26, 1919.

NAVY ASKS TO BE HEARD ON AIR BILL.—The opposition of the navy to an amalgamation of the government's air activities under a single head was expressed in no uncertain language by Acting Secretary Roosevelt in a letter to Senator Page, chairman of the Senate Committee on Naval Affairs, and to Chairman Butler, of the House Committee on Naval Affairs, on August 22. The Acting Secretary wrote:

"A bill, S. 2693, 'To create a Department of Aeronautics, defining the powers and duties of the director thereof, providing for the organization, disposition and administration of a U. S. Air Force, creating the U. S. Air Reserve, and providing for the development of civil and commercial aviation,' was introduced by Senator New on July 31, 1919, and referred to the Senate Committee on Military Affairs. I have requested the chairman of the Committee on Military Affairs of the Senate that the Navy Department be granted an opportunity to be heard on the bill before final action is taken, and I have been informed that such an opportunity will be granted. I write to call your attention to this bill, as its provisions vitally affect the policy of the Navy Department relating to aeronautics in the navy and marine corps, and it is the unanimous judgment of the responsible officials of the Navy Department that if the bill, in its present form, is enacted into law it will materially interfere with the efficiency of naval aviation."—*Army and Navy Journal*, Sept. 6, 1919.

BRITISH NAVAL INFORMATION CONFIDENTIAL.—Secretary Baker issued information on September 20 for the guidance of all concerned containing the following letter from the British Admiralty: "A considerable amount of information has recently been supplied to official represensatives of the U. S. Army, Navy and Government on technical matters connected with

naval material; *e. g.*, guns, torpedoes, mines, anti-submarine devices, signaling systems, etc. I beg to request that you will be good enough to arrange for all such information to be treated as confidential, and not to be published, except for the use of responsible officials of the U. S. Government." Secretary Baker directed that all information of this nature heretofore or hereafter received shall be considered strictly in confidence.—*Army and Navy Journal,* Oct. 4, 1919.

MATÉRIEL

THE U. S. S. "IDAHO" IS SPEEDY.—The U. S. S. *Idaho,* the latest battleship of the U. S. Navy, during its official speed trial on the North Pacific coast on September 29, 1919, attained a maximum speed of 22 knots and averaged 21 9.20 knots for the four-hour period, according to an Associated Press dispatch. These figures are said to be the highest ever attained by a United States battleship.—*Army and Navy Journal,* Oct. 4, 1919.

BASES FOR PACIFIC FLEET.—The Secretary of the Navy returned to Washington from the Pacific coast on September 22 and will soon submit data to the Senate and House Committees on Naval Affairs concerning necessary improvements and construction projects on the basis of facts learned by the naval mission to the Pacific coast. The battleships of the Pacific fleet will be based at Puget Sound and San Francisco, where there are efficient navy yards. Puget Sound may be selected as the fleet base, it is reported. Smaller stations may be established for the repair of small warships. Mr. Daniels said that no large fleet movements would be undertaken before January because of the necessity of overhauling the ships.—*Army and Navy Journal,* Sept. 27, 1919.

ADMIRAL FULLAM PREDICTS NAVY CHANGES.—Rear Admiral W. F. Fullam, U. S. N., contributed to the *New York Herald* of September 29 an article discussing the probability "that a complete revolution in naval architecture" may be forced upon us owing to the necessity of more powerful protection for naval vessels against torpedo attacks from the air and from under water. Admiral Fullam points out "there are five different methods of attack that involve the possible destruction of the immense and costly ships that are now regarded as the measure of sea power," and he foresees that as the result of these effective forms of attack, "the present types of dreadnoughts and cruisers will be driven from the seas." Admiral Fullam summarizes the methods of attack as the plunging fire of modern guns at extreme ranges of 16,000 yards and above, attack by bombing from aircraft, submarine mines, torpedoes fired from destroyers, and torpedoes fired from torpedo-planes. He illustrates how at extreme ranges projectiles rise high in the air and says that the impact of such projectiles on "the unarmored deck will inevitably penetrate to the vitals and cripple or completely destroy the ship." Aircraft will be more and more, he states, a determining factor in successful range determination, and he declares that "sea power, or fighting power, in the future will be largely dependent upon control of the air, and that fleet that secures this control in future battles must win, other things being approximately equal. In other words, aircraft will not only constitute dangerous offensive weapons in themselves, but they will contribute greatly to the accurate and effective use of a ship's guns in battle. They will be of double value, and from present indications airplanes will soon become one of the most invincible elements in sea power."—*Army and Navy Journal,* Oct. 4, 1919.

U. S. NAVY MAKES RAPID GROWTH.—The rapid rise of the United States as a naval power during the last two years is graphically demonstrated in figures showing the sea strength of the various world powers, compiled by the Navy Department's office of naval intelligence. They show that the United States, close pressed by France in 1917 for its place as third naval

power in the world, is now second only to Great Britain, and is at present pushing to completion a building program that will make the American Navy, for the first time in recent history, a formidable contender for first naval honors.

A little more than two years ago, the figures show, Germany, then second naval power, boasted more than 100 more ships of all classes than the United States, with a total tonnage exceeding that of the American Navy by nearly 200,000. Great Britain's fleet at that time numbered a total of 680 ships, aggregating 2,375,564 tons, as compared with Germany's 262 ships and 1,058,240 tons and the United States' 153 ships and 860,017 tons.

The completion of the present building programs, a matter of about three years, will find the chief of naval powers of the world with the following relative strengths: Great Britain, 955 ships, aggregating 2,772,542 tons; United States, 608 ships, totaling 2,117,922 tons; Japan, 170 ships, totaling 785,239 tons; France, 253 ships, totaling 719,237 tons, and Germany, 463 ships, totaling 923,437 tons.

As a result of the great torpedo-boat destroyer building program carried out by the United States during the war the American Navy now includes more than 150 destroyers of the fastest and latest type, with nearly 200 more building or contracted for. Great Britain owns about 425 of this type of vessel, many of them old and of little modern naval value, and have about 110 building or authorized. Germany's destroyer force has been so reduced as to make it a negligible factor. Japan owns 40 modern destroyers, according to the best available figures and have about 20 under construction.

Great Britain emerged from the war with by far the most powerful battleship and battle cruiser force in the world, although the United States now has under construction a formidable aggregation of major ships. England's Navy to-day includes 55 battleships and 9 battle cruisers less than 20 years old, with 4 powerful battle cruisers now under construction.

The United States has 36 battleships capable of holding a place in a modern battle line and not including a number of old type battleships listed for sale or the scrap heap. Thirteen of the most modern battleships in the world are under construction for the United States, and six battle cruisers are authorized and will be completed during the next three years.

Japan has 13 battleships and several battle cruisers completed and four battle cruisers under construction or authorized. Germany retains 30 battleships and one battle cruiser, most of which are of practically no naval value, and has two battleships and three battle cruisers laid down, on which construction has been stopped. France has 18 battleships and no battle cruisers completed and five battleships and four battle cruisers under construction.

The completion of the present building programs will find the following line-up of major ships: Great Britain, 55 battleships and 13 battle cruisers; United States, 49 battleships and 6 battle cruisers; Japan, 13 battleships and 11 battle cruisers; Germany, 32 battleships and 4 battle cruisers, still subject to the final naval peace terms, and France, 23 battleships and 4 battle cruisers.

Great Britain leads the world in cruiser and light cruiser strength, with a total of 118 vessels of these types, with 30 for the United States, 28 for Japan, 37 for Germany and 19 for France.—*The Naval Monthly*, Sept., 1919.

OPERATIONS

U. S. NAVAL FORCE LANDS IN DALMATIA.—The Navy Department on September 27 made public a cablegram from Rear Admiral Harry S. Knapp, U. S. N., commanding naval forces operating in European waters, saying that on September 23 a number of Italians surprised and captured Trau, a Dalmatian port in the zone assigned by the Supreme Council to be policed by American forces. A small landing force from the U. S. S. *Olympia* succeeded in recovering the town and preserving order there without bloodshed. Serbian forces were persuaded by Rear Admiral Philip Andrews,

U. S. N., commanding naval forces operating in Mediterranean waters, to take no action, Admiral Knapp's report states.

The subject of the landing of the American force was brought up in the United States Senate on September 29. As a result Vice President Marshall on October 2 sent to the Senate a communication from Secretary of the Navy Daniels, dated September 30, relative to the recent operations of U. S. Naval forces on the Dalmatian coast, which included a report from Rear Admiral Harry S. Knapp, U. S. N., commanding American Naval forces in Europe, who is stationed in London.

Secretary Daniels in his communication explains that the armistice line extends from Cape Flanka inland. North and west of this line Italian troops are in occupation. South and east the line is garrisoned by Serbian troops. This latter section of the Dalmatian coast is the headquarters of the American Naval forces, in which by agreement after the Armistice American Naval forces took charge of all one-time Austrian-Hungarian vessels found there and which has since been generally called American zone. The Americans have no forces on shore, but have extended a strong moral influence for the preservation of order and avoidance of a clash between Italians and Jugo-Slavs. There has been considerable friction along the armistice line between Serbians and Italians, but by the tactful firmness of Rear Admrial Philip Andrews, U. S. N., it has been kept from causing serious results.

On September 23 three truck loads of Italian soldiers in command of a captain crossed the armistice line and surprised and captured the small Serbian garrison at Trau. The Italian authorities informed the senior American officer present, Capt. D. F. Boyd, that the move was unwarranted and asked that the raiders be turned back. Captain Boyd sent a destroyer and two chasers to Trau at once, then saw the Serbian commander and got him to agree not to order an advance until he had an opportunity to get the Italians to withdraw. He sent Lieut. Commander R. S. Fields, U. S. N., and Commander Morony, of the Italian ship *Puglia,* by automobile to Trau and himself went in the U. S. S. *Olympia* to Trau. On arrival he found the Italians had been induced to return, leaving however, the Italian Army captain and three soldiers owing to breakdown of their truck. He landed a small guard from the U. S. S. *Cowell* and U. S. S. *Olympia* to see that no harm was done Italians and to preserve order pending the arrival of Serbian troops. He put the Italian army captain and three soldiers on an Indian motor boat and turned them over in charge of an Italian naval officer. Upon the arrival of the Serbian troops he withdrew the U. S. bluejackets, after receiving assurance that no violence would be offered civilians.

The Italian admiral, Milo, in command of ships and troops in Italian zone of occupation, sent the senior Italian officer present at Spalato to the U. S. S. *Olympia* with thanks for sending the Trau raiders back. He has brought the officer who commanded the raiding force to trial by court martial. The whole affair was most creditably handled and the prompt action of Captain Boyd, Secretary Daniels says, undoubtedly prevented a very serious incident which might have resulted in open warfare between Italians and Serbians. The landing was for the protection of the offending Italians left in Trau until adequate Serbian forces could arrive to preserve order.

The fact that the Italian authorities requested action of Captain Boyd, that he was thanked by Admiral Milo for his action and that Admiral Milo brought the offending officer to trial by court martial, Secretary Daniels states, all go to show that the raid was an isolated act of hotheads done in defiance of Italian authority, and that America acted in cooperation with the Italians to restore the situation. That no serious results happened is due to the prompt and efficient action of American forces, Secretary Daniels adds. Had they not so acted there would almost inevitably have been bloodshed, which would perhaps have resulted in a state of actual war between Italy and Jugo-Slavia owing to the intensity of feeling existing over the Dalmatian question.—*Army and Navy Journal,* Oct. 4, 1919.

MERCHANT MARINE

"LEVIATHAN" TO BE CHANGED TO AN OIL BURNER.—The *Leviathan,* it is learned on excellent authority, is to be converted in the near future from a coal to an oil burner. The change, it is claimed, will do away with no less than 300 firemen. This decision of the Shipping Board is in line with what most of the leading steamship companies are doing. The *Aquitania,* the largest of the Cunard liners, is to be converted to oil burning during the next few months. The Cunard Line's new passenger and freight vessels are all to be oil burners.

With the *Leviathan,* the largest ship afloat, converted to oil burning the development towards oil bunkers will undoubtedly be stimulated. She measures 54,282 gross tons and has steam turbines. She was launched in 1914 from the Blohm & Voss Yard, Hamburg.—*The Nautical Gazette,* Sept. 20, 1919.

1227 VESSELS DELIVERED.—A tabulation made by the Shipping Board shows a total of 1227 vessels delivered up to the week ending August 9. During that week 30 vessels, representing 97,550 gross tons (146,325 DWT) were turned over to the Shipping Board by the Emergency Fleet Corporation. The gross tonnage delivered to date is 4,542,278 (6,813,417 DWT).

During the month of July 108 vessels, aggregating 400,039 gross tons (600,058 DWT), were launched from yards under the control of the Shipping Board. A world's record in launching was established in July, 1918, when 124 vessels, of 423,167 gross tons (634,750 DWT), were sent overboard from Shipping Board yards. The launchings of July, 1919, were therefore only 16 less than the number launched during the record month of last year.—*United States Bulletin,* Aug. 18, 1919.

NEW MARINE SCALE FOR PACIFIC COAST ENGINEERS.—Marine engineers of the Pacific Coast received everything they asked for at the recent conference at San Francisco, the Atlantic scale being adopted without a struggle. The revised wage scale is retroactive to August 1 on all Shipping Board vessels dispatched from the Pacific Coast, regardless of whether or not a clause to that effect was inserted in the ship's articles. According to the agreement adopted, vessels are divided according to their size and power into five classes. Steel vessels produced in Portland all fall into class C. Wooden vessels built at Portland are of classes D and E. The scale adopted for the Pacific Coast and thus made uniform for all seaboards of the United States, follows:

	Class C	Class D	Class E
Master	$357.50	$343.75	$330.00
Chief engineer	332.50	318.75	305.00
First officer, first asst. engineer	228.75	222.50	216.25
Second officer, second engineer	200.00	193.75	187.50
Third officer, third engineer	176.25	170.00	163.75

The scale adopted for all vessels regardless of size and power includes the following wages: Carpenter, $105; boatswain, $95; able seaman, $90; quartermaster, $90; ordinary seaman, $65.—*The Nautical Gazette,* Sept. 13, 1919.

HOG ISLAND SHIPS RECORD.—Forty-one ocean-going carriers built at the Hog Island shipyard have steamed more than 336,192 nautical miles, carrying 425,000 tons of American products to foreign ports, according to figures compiled here. All of the vessels, turned over to the Shipping Board by the American International Shipbuilding Corporation since August 5, 1918, are registered at the port of Philadelphia, and 18 of the ships delivered their first cargoes from Philadelphia.

Accomplishing more than any other shipyard in the country to place the American merchant marine on the seven seas, the Hog Island yard has

launched 52 vessels, 11 of which will soon be delivered. Some of the ships have opened new trade routes between Philadelphia and South America, but most of them were used to carry foodstuffs to the stricken countries of Europe. Destinations of the 41 vessels include England, France, Italy, Germany, Japan, Brazil, Peru, Chili, Panama, Sweden, Norway, Finland, Batavia, Wales, Belgium, Buenos Aires, Colombo, Denmark, Cuba and the Verde Islands. The *Quistconck*, the first vessel delivered, has a mileage of 34,129 to its credit.—*The Nautical Gazette*, Sept. 13, 1919

ARMY TO RETAIN CERTAIN GERMAN LINERS.—Testifying before the House Military Affairs Committee General Peyton C. March, chief of staff, stated that in the allocation of the German ships interned in this country which this government refused to put into a general pool for distribution among the Allies, a number of the German liners will be retained permanently as part of the army transport fleet.

By obtaining a great number of these ships, others of which are to be put in the naval and merchant marine service of the United States, General March said that this country would never again be without sufficient transports, as was the case when war was declared against Germany.

General March said that the President, who held out against giving over the German ships interned in this country to a pool, had decided upon a policy of distribution among the different services. The detailed announcement, he said, would be made shortly showing how many ships will go to the army and the merchant marine. This government intends holding these seized German vessels as part payment for the submarine destruction to American commerce and lives.

According to General March, the army will get a great number of these ships which will not be needed constantly. When they are not used in the military service they will be leased to private corporations for commercial purposes, subject to the call of the War Department in case of any emergency.—*The Nautical Gazette*, Sept. 20, 1919.

WAR CHANGES IN MERCHANT MARINE.—Figures compiled by Lloyd's Register of Shipping show the changes which have taken place in the steam and sailer tonnage possessed by the various maritime powers between 1914 and 1919. Of the 27 countries listed in both years only seven now own more than one million tons of shipping as against 11 at the outbreak of the war. Germany, Austria, Russia and Sweden are the four nations which are no longer in the million-ton class. Nine countries show an increase in tonnage over pre-war times, the United States leading with a gain of 7,723,579 gross tons. Japan's merchant fleet grew by 616,880 tons, while that of the British Dominions was augmented by 264,121 tons. Brazil and Portugal show increases of 188,746 and 140,281 tons, respectively, the last-named country through the requisitioning of German ships having more than doubled the tonnage of its pre-war fleet. Steam tonnage changes were analyzed in our issue of last week. As far as sailing vessels are concerned, this class of craft constitutes now but one-seventeenth of the world's total merchant tonnage as contrasted with one-twelfth five years ago. It is true that the United States and seven other countries have added to their sailer tonnage during the war period, but in every case the increase has been very slight. On the other hand, Norway has lost more than one-half of her sailers, both as regards number and tonnage. Three-eighths of the world's sailing fleet flies the American flag. The only other nations possessing a considerable amount of sailing vessel tonnage are France and Norway.—*The Nautical Gazette*, Sept. 13, 1919.

SHIP BUILDING IN UNITED STATES AND ABROAD.—More than 2500 merchant vessels, aggregating over 8,000,000 tons, were under construction in the world's shipyards June 30, 1919. Before the world war the largest construction, 3,445,000 tons, reported June 30, 1913. The United States

is in the lead at present with nearly 1000 ships with a gross tonnage of 3,874,143, nearly one-third of which are wood.

To speed up production, the British shipyards are negotiating for an understanding whereby the employers agree not to place any limit on the possible earnings of workmen paid by results and the trade unions on their part, undertake to discontinue restrictions of output and that they will cancel any rules that limit output.

In Canada, for example, although water transportation is in its infancy, the government is building a large merchant marine in three types of ships at an estimated cost of more than $52,000,000.—*Engineering World*, Oct. 1, 1919.

NAVIGATION AND RADIO

WIRELESS COMMUNICATION'S ADVANCE.—Very few branches of science have received greater impetus in their development during the war than wireless telegraphy and wireless telephony. Those interested in the subject who have not been directly associated with its progress during the past four and a half years will be amazed when the veil of secrecy is lifted and they become acquainted with the efficiency of present-day apparatus.

They will be struck first of all by the appearance of compactness of the apparatus, and on being further initiated will find that the simplicity of operation amounts almost to a revolution of method.

When the war broke out wireless communication in the British Navy and Army was as effective as was possible at that stage in the progress of the art. As the war proceeded those in authority realized how vitally necessary it was in the interests of the services that every effort possible be put forward to design apparatus for wireless communication possessing qualities of increased sensitiveness, increased selectivity, and, if possible, assuring secrecy.

The needs of the air service presented a peculiar problem. At first it was necessary to establish reliable communication from machines in the air to units on the ground to which observers wished to transmit the results of their observations. Later it was deemed advisable to communicate messages by means of wireless from ground units to machines in the air cooperating with them.

When "formation flights" became the essential method of attack and defense, it was decided that efforts should be made to give the leaders of formations vocal command of their units. This was accomplished by improvements in wireless telephony, which proved so successful that flying officers could speak to others in machines flying near them, with as little effort and with as good results as if they were chatting in a drawing-room.

When long distance bombing raids began, wireless again came to the fore and provided a means of navigating machines without the necessity of making ground observations. At the time the armistice was signed, aeroplanes were being navigated by wireless with perfect accuracy independent of visual observations of any kind.

Wireless as an Aid to Navigation.—It may prove of interest to those connected with shipping to know how far these improvements may be employed to assist in the navigation of ships at sea, and to what extent their employment may tend to decrease the risk of disasters.

Ships can now be fitted with small wireless telephone sets, which would enable the commanders or navigating officers on the bridge of one ship to speak to officers on the bridge of another ship within the effective range of their sets (say 30 miles). The cost of the set would, without royalties, be so low as to be almost negligible. The advantages of such a service during foggy weather may be readily appreciated by those responsible for the safe navigation of ships. It is also possible at the present time to equip ships with direction finders capable of taking a bearing from a wireless transmitting station (either ship or shore) to within an accuracy of one degree at the normal range of the transmitting station.

By means of one of these direction finders the commander of a ship could navigate his vessel with absolute accuracy without any observations. It would enable him to set his course when approaching such points as the fastnet and innishtrahull with safety in a fog, thereby avoiding the possible loss of a good deal of costly time.

The best method of employing these instruments for navigational purposes would be as follows:

A small wireless telephone transmitting and receiving set should be installed in the wireless cabin of the ship and should be subject to a remote control through the medium of a change-over switch to the bridge. The wave length of 300 meters granted to all ships, but which is seldom if ever resorted to, could be used exclusively for telephone work, thus avoiding as far as possible interference with ordinary wireless work.

The special aerial rigged for use with the direction finder could be used for this set to a very good advantage. In fact, the direction finder apparatus itself could be used for the receiving side so that when voice signals were being received the direction from which they came could be indicated automatically.

During fog every ship fitted with telephone sets would send out a predetermined voice signal on a wave length of 300 meters at definite intervals, of, say, 13 minutes. Any two ships arriving within a distance of 30 miles of each other would thus indicate their presence. The respective operators would immediately take the bearing and obtain the course of the other ship and convey the full information to the bridge. If for any reason one of the commanders wished to converse with the other this could be done easily and effectively from bridge to bridge by means of the remote control. The instruments could be designed in such a manner that the effective range could be reduced to ten or five miles by the operation of a small switch. This would be for use in channels or other congested waters.

The direction finder, apart from its uses in connection with the telephone would be used extensively both in good and bad weather. When only dead reckoning is possible these bearings would materially assist the bridge whilst in good weather they would tend to show how far they were capable of being relied upon as well as giving the operators practice in taking them quickly and accurately.

Hitherto, wireless has played a very heroic part in the mercantile marine by obtaining assistance for vessels in distress. In the future it should be the aim of those responsible for its employment to use it as far as possible to reduce the perils of the sea. A far-sighted policy on the part of shipowners with regard to wireless would go a long way toward assisting those in command of their ships to navigate them safely. Considering the present possibilities of wireless as an aid to navigation, three-fifths of the accidents to ships at sea come under the heading of preventable losses.—*The Nautical Gazette*, Sept. 27, 1919.

RADIO TELEPHONE FROM HYDROAEROPLANE TO SUBMERGED SUBMARINE.—New London, Conn.—A radio experiment made on September 16 off New London in Lond Island Sound by the Experiment Station, Naval Station, established communication, both telephonic and telegraphic, between a hydroaeroplane flying 2000 feet in the air and a submarine submerged several fathoms in the water.

This was a demonstration for the delegates to the annual convention of the Edison Society of Electrical Engineers being held at Eastern Point.

It is said to be the first time than an aeroplane and a submerged submarine have communicated with each other directly, and is considered by naval officers here as an important factor in coast defense and in naval warfare.—*Aerial Age Weekly*, Sept. 29, 1919.

SHIP FOG GUIDING DEVICE.—According to the New York *Times*, Earl C. Hanson, an inventor of Los Angeles, had invented an auditory system for guiding ships in a fog, which, according to those who have examined the

apparatus, promises to make ocean travel free from all dangers of collision due to fogs, if further tests prove as satisfactory as previous experiments.

The new device is described as simplicity itself. A cable is laid in the center of the ship channel. Through the listening devices on board, the ship gives off a sound of certain pitch that cannot be mistaken for any other sound. The ship hugs the cable from harbor line to the dock. On the bridge and in the captain's cabin listening devices like telephone receivers are placed and attached by wires to the hull of the ship. The ship follows the course of the cable. Any variation away from the cable is indicated by visible indicators which show in feet the distance away from the cable and the ship is then put back over the cable by the steering rudder in the usual manner.

By the ear receivers the indicators may be confirmed at all times. Vessels going into port will use one cable; those coming out another. The sound on each is different and there can be no confusion and therefore no collision.

Along the cable at mile intervals a section is insulated with lead. Through this no sound can come and therefore the man on listening duty can tell instantly how far the ship has progressed, and by the cable chart in front of him can tell where the cable turns and where the ship must be steered to follow the curve of the cable and the center of the channel. The new device, according to those who have tested it and recommended its use, is as reliable as the telephone. It will work in all conditions of water and weather, it is said, and no amount of electricity in the air or powerful wireless currents about the ship can effect it in any way.—*The Nautical Gazette*, Sept. 20, 1919.

ENGINEERING

SOMETHING NEW IN CONDENSERS.—A new development in steam surface condensers is announced by the Wheeler Condenser & Engineering Co., Carteret, N. J. It is a patented "compartment condenser" that can be cleaned while in service without shutting down the turbine. Any tube or tubes may be temporarily plugged and other repairs made without taking the condenser out of service.

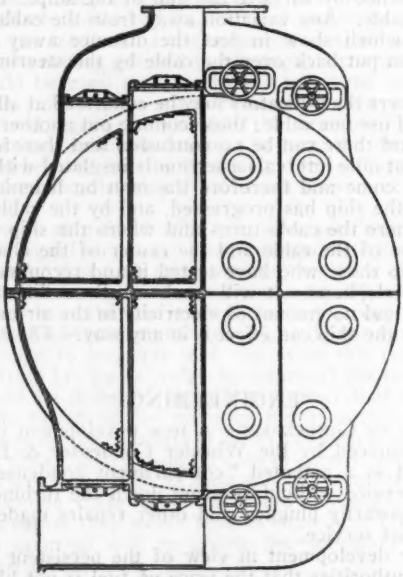
This is a timely development in view of the persistent claims made by well-known fuel authorities that the price of fuel is not likely to go down for some time if at all. This condenser will enable the chief engineer to constantly maintain clean condensers, hence a constantly high vacuum. All engineers of experience know that in addition to increasing output a high vacuum means low fuel consumption and a considerable saving in money year in year out.

Upon installation of this condenser, it is claimed there need be no interference with the operation of the turbine. At the present time, in many important power stations, even where water conditions are regarded as good, it is necessary to occasionally shut down the turbine for a period sufficiently long to give the condenser a thorough cleaning. In such cases, and in fact in all cases where continuous and highly efficient operation are desirable, this new type will fill a long felt want.

To clean the average condenser is not a difficult task, but it is time-consuming, and for that reason the chief engineer is naturally tempted to put cleaning off until "to-morrow," or "next week," or "next month." During his wait for the opportune time the vacuum gradually drops and, with the drop, coal wastage increases. Sometimes the loss of vacuum amounts to several inches of mercury, hence the compartment condenser which can be kept constantly clean regardless of load conditions, will in the long run prove to be a paying investment from the standpoints of both uninterrupted service and coal saving.

The illustration indicates clearly how the compartments are arranged. The condenser shown is divided into four compartments, each compartment being equipped with a set of valves to control the circulating water. To

clean the condenser while the turbine is delivering full power, the operator simply shuts off the water from one compartment, removes the cover, cleans the tubes, replaces the cover, turns on the water again, and then passes on to the next compartment repeating the operation until the four compartments or the entire condenser is clean. Thus, while one compartment is being cleaned, the other compartments are in full operation, temporarily taking over the entire turbine load.

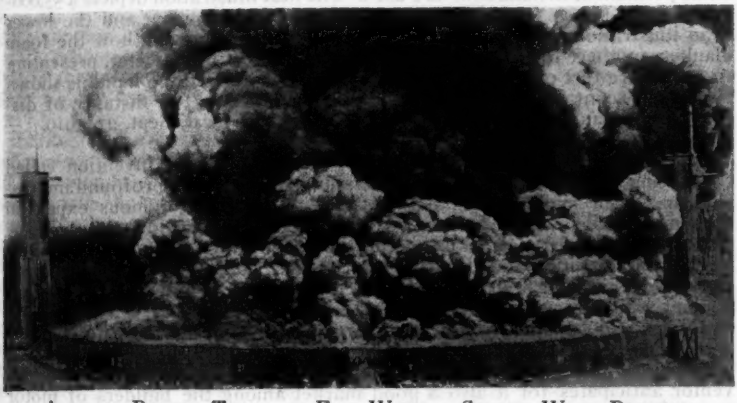


WHEELER COMPARTMENT CONDENSER

An advantage that will not be overlooked by engineers in localities where water is bad is that no matter how severe the water conditions may be, the compartment condenser will take care of the cleaning problem. Shut downs for frequent cleaning will become a thing of the past. This condenser can be cleaned as many times per week or months as desired.—*Shipping*, Sept. 20, 1919.

TURNING AN AUXILIARY CONDENSER INTO AN OIL COOLER.—The S. S. *Anoka* of the American Hawaiian Steamship Company, which recently arrived in New York harbor from Portland, Ore., ran through very warm seas, the log book showing sea water temperature of 88 degrees day after day. This condition made it very difficult to keep the lubricating oil cool, especially as the boat was equipped with only one cooler. In fact the oil entered the cooler at 124 degrees and came out but one degree lower. As a result of the use of this hot oil the bearings of her turbines grew hotter and hotter, and at last, when they reached 164 degrees, the chief engineer, Arthur Sheridan, decided that something had to be done. Casting around for a remedy, he conceived the novel idea of transforming his auxiliary condenser into an oil cooler, and this he proceeded to do with the aid of such tools and piping as he had on board. The success of this plan was complete, as the oil temperature was immediately reduced to 103 degrees and the bearings kept in proper condition. After reaching port, Chief Sheridan boiled out the condenser with soda and kerosene and was ready for port operation.—*Scientific American*, Sept. 13, 1919.

PUTTING OUT A BURNING OIL TANK.—Oil and gasoline are risky things to store, and the insurance companies ask high rates on them, owing to the difficulty in extinguishing the flames by ordinary means if the storage tank should catch fire. The use of water results in a further spread of the blaze over a larger area on account of the well-known property of oil to float on water. The use of carbonic-acid gas is ineffective, because of the great diffusion in the atmosphere by the rising currents of air and other natural conditions. Both of these difficulties are reported as being remedied by a



A 55,000-BARREL TANK ON FIRE WITH A STRONG WIND BLOWING

PUT OUT IN 48 SECONDS BY CARBONIC-ACID BUBBLES

method which has been recently introduced into practical use. Says a writer in *The Engineering and Mining Journal* (New York, August 30):

"The process is based upon the principle of applying a froth or blanket of bubbles containing the carbonic-acid gas, which thereby concentrates the gas so as to make it most effective. It is also said that by this means, not only are the flames extinguished but the smoke and fumes are also smothered.

"Another advantage stated is the comparative dryness of the foam compared to water, as it possesses no tendency to soak into the material, which

results in less damage. The bubbles are minute in size and hold the gas efficiently. The composition of the solution used for the formation of the bubbles has not been revealed by the inventors. The froth resulting from the release of the liquid from the extinguisher is eight times in volume that of the original liquid, which therefore gives it a large area-covering capacity. The physical properties show the froth to be heavy, tenacious, and lasting. Portable means for the application of the method have been provided by the use of fire pails, hand extinguishers and portable engines. For large storage tanks permanent installations are used. The first illustration depicts a 55,000-barrel tank fire at its height, with a strong wind blowing, and the lower is an illustration of the same tank 48 seconds later, showing how the foam blanket smothered the blaze. The tank was 114 feet in diameter, presenting 10,200 square feet of surface. The method of projecting the liquid is shown by the two containers on opposite sides of the tank. The distance of discharge is a maximum of 50 feet."—*The Literary Digest,* Sept. 27, 1919.

CONDUCTING ALUMINUM—A NEW INVENTION.—A new invention called conducting aluminum M.277, which is said to be creating a profound impression, has been made by Dr. Georges Giulini, the most famous expert in aluminum trade. This new metal is produced by putting the ordinary aluminum through a special patented process, by which it acquires the same mechanical qualities and capacities as bronze, copper, and brass without changing its specific weight. It is said that the price of the new metal can be kept within very low limits; so that, even at the pre-war prices of other metals, it will be able, by reason of its smaller specific weight, to compete with copper and brass very favorably. The fact that the new metal is a conductor will make it especially in demand in the electrical trade. The inventor anticipates for it also a good market among the builders of motor cars, air-planes, ships, and railway carriages. Leading men to whom the invention is already known, are said to be much impressed with its possibilities.—*Scientific American,* Sept. 20, 1919.

NEW ELECTRIC BULBS.—There has beeen recently introduced a new form of electric bulb which possesses marked advantages over the usual bulb in fixtures where no special shade or other protection is afforded for the eyes. The outstanding characteristic of this lamp is the pleasing softness of its light. The large volume of light which the small filament emits is diffused to the point where the bulb itself appears luminous. The white bulb—it is milky white in appearance—is made in the 50-watt size, and notwithstanding the low brightness of the bulb, supplies more light than the 50-watt clear-glass bulb.—*Scientific American,* Sept. 20, 1919.

DIESEL ENGINE POWER OF THE FUTURE.—In a recent address before the American Society of Mechanical Engineers at Berkeley, Mr. E. N. Percy predicted that the Diesel engine would revolutionize American industry within a brief period. In part he said:

"The entire European maritime fleet is equipping its merchant marine with Diesel engines. Steamships cannot compete with motorships, and no country except the United States is now building steamships in quantity. The internal combustion engine possesses tremendous economic advantages over the steam engine. It requires only a third of present engine-room crews to operate, one-third of the fuel and its smaller bulk and cargo space fuel requirements afford far greater cargo space.

"Norway and Sweden are building 44 large motorships requiring 78 main Diesel engines. The East Asiatic Company, of Denmark, now has a large fleet of Diesel ships. The Scandinavian shippers are lifting steam engines from the holds and installing motors.

"Italy is now building a fleet of 8000-ton motorships. England is standardizing motorships of 8200 tons and 3300 horsepower. Eight of these vessels have been delivered, and a new one is launched every month.

"Prior to the armistice, Germany had evolved plans for an immense fleet of Diesel vessels and had a yard constructed with the foundation for eight shipways laid down.

"Twenty-five motorships equipped with Dutch Diesel engines of 4000 horsepower are now in active service. They have a tremendous cruising radius and some of them have run 300,000 miles with greater reliability and continuity than the average steamship.

"American firms for some years have been endeavoring to build semi-Diesels, light Diesels and high-speed Diesels with the result that Diesel engines have a very bad name in this country. They attempted to build a cheap engine.

"A reliable engine of this type is necessarily heavy and expensive, costing in the neighborhood of $150 per horsepower for the engine alone and $250 for the entire installation.—*The Nautical Gazette*, Sept. 6, 1919.

LIGNUM-VITÆ, THE VITAL WOOD.—The propeller shaft of every battleship, every destroyer, every transport, in fact, every large steamship, revolves in a wooden bearing at the stern end. Of all the thousands of woods in the world, true lignum-vitæ, a native of the West Indies and certain other parts of tropical America, is the only one that has been found equal to this exacting service. The peculiar properties which so well fit lignum-vitæ for the purpose are due to the arrangement of the fibers and the resin-content of the sap cells. The fibers never run straight up and down the log, but weave back and forth in a serpentine manner that cross and criss-cross like the corded fabric of an automobile tire. The result is a material of extreme tenacity and toughness. When the sap cells cease to function, their every nook and cranny become filled with a resin which is about a third heavier than water. The result is a material which weights about 80 pounds per cubic foot.

Stern bearings provide the most important use for lignum-vitæ but by no means the only one. Formerly it was in great demand for bowling balls, but now only one ball in ten is made of wood. A large quantity of low-grade logs, known as "cutting-up" wood, is consumed in the manufacture of rollers for furniture casters. Small round sticks made excellent mallets and fill a large demand, especially in Engand. Another important use is for sheaves of pulleys, and they have been known to last in constant use for 70 years. Another nautical application is for "dead-eyes," a small flattish block with a grooved rim to fit in the bight of a rope or encircled by an iron band, pierced with three holes to receive a lanyard, and used to extend the shrouds and stays. Among the miscellaneous uses may be mentioned stencil and chisel blocks, watchmakers' blocks, mortars and pestles, dowels, golf-club heads, wooden cogs, water wheels and block guides for band saws. In building the Panama Canal, the true lignum-vitæ made the most serviceable railroad ties that could be obtained. Between 150 and 200 tons of genuine lignum-vitæ are used every year in New York for fuel in grate fires. The very dense nature of the wood, together with the heavy resin content, produces a fuel with intense glowing heat and good lasting qualities. This provides one outlet for defective and crooked logs which are found in every shipment.—*Engineering World*, Oct. 1, 1919.

DEEP-WATER SPEEDS.—The new British destroyers of the "S" class, now nearly all completed, have reached some remarkably high speeds on their trials, well over the 36 knots for which they were designed. At least two of the Yarrow boats, the *Torch* and *Turquoise* have exceeded 39 knots. Curiously enough, however, the speed of 40.4 knots which the *Teazer*, of Messrs. Thornycroft, was reported to have achieved soon after her completion in July, 1917, remains the highest on record, but if this speed is accepted for purposes of comparison there is involved the question of the difference in trial courses. The *Teazer's* record was obtained on a run

between St. Catherine's Point and Ventnor Pier, and the Channel between these positions is shallower than on the deep-water course at Skelmorlie, over which the greater number of our destroyers have been tried during the war. There seems to have been an idea, in big ships, at least, that a higher speed could be obtained in deep water, as where the Channel was shallow the drag of the bottom affected the rate of speed of the ship. As far as destroyers are concerned, this is certainly not the case, for the highest speeds have been made in shallow water. The *Wolsey*, for example, loaded to 1188 tons displacement, made 38.2 knots in shallow water in the Channel, but on the deep-water course at Skelmorlie, loaded to 1206 tons (only 18 tons more), her speed was 36.6 knots, or over 1½ knot less. A similar result was obtained with the flotilla leader *Wallace*, completed after the armistice. Her builders, Messrs. Thornycroft, obtained permission to try her over the deep-water course at Skelmorlie, in order to ascertain the difference in performance as compared with that in 20 fathoms. Over the latter depth she realized 37.79 knots. Tried at Skelmorlie the next week, the speed, at the same loading, was 37.72 knots, but this was only obtained at an increased horsepower of 960. This bore out the previous experience that deeper water means slower speed.—*The Army and Navy Gazette*, Sept. 13, 1919.

RUST-PROOFING COATINGS FOR IRON AND STEEL.—The Bureau of Standards at Washington has issued a circular on a series of investigations concerning metallic coatings for the rust-proofing of iron and steel. The Bureau has studied a long series of methods to secure this result by means of metallic coatings, paint, lacquers, varnishes and enamels. The circular deals with the various types of metallic coatings, including those closely related in their nature and method of production, oxide and similar coatings. The methods of application and characteristics of the different metallic coatings are discussed, and it is shown that zinc, because of its electro-positive nature with respect to iron, is the one to be relied upon when protection against corrosion is the prime consideration. Other considerations, such as freedom from toxic effects in food containers, often lead to the choice of some other metal than zinc.

The circular discusses the structure and uniformity of distribution of the different classes of zinc coatings and their bearing upon the behavior in service. Of the various methods which are used for the testing of coated materials, the "salt spray" test is regarded as the most satisfactory. The articles to be tested are exposed to a fine mist of saturated salt solution, and the length of time they withstand this severe exposure is a fair index of the service life that may be expected for the specimen. This test while not entirely satisfactory, is the best which has yet been suggested, says the report.

A series of recommendations concerning the choice of protective metallic coatings for various types of works is given, together with a good working bibliography of the subject.—*Engineering and Industrial Management*, Aug. 28, 1919.

AERONAUTICS

REDUCING THE FIRE HAZARD IN THE AIRPLANE.—Fire is the greatest danger faced by the airman. Structural collapse, loss of control, collision, engine failure, bad landings—all these possibilities are serious, to be sure; but conflagration in mid-air is the one danger over which the airman has little control and still less chance of combatting, once it starts.

Various methods of reducing the fire hazard to a minimum have been worked out by British and French aircraft constructors, and many of the modern French airplanes are fitted with detachable or protected fuel tanks or tanks arranged with rip patches. In the case of the French airplanes, too, great care is taken with the gasoline, oil and water installations, in order to insure that installation failures should not provoke disasters. All air in-

takes have to be carried outside the engine fairing and so arranged that communication with the interior of the cowling is impossible, so that the risk from back fires is reduced to a minimum. Pressure fed gasoline delivery is forbidden. Ignition wires must pass under and not over the gasoline pipes.

The obvious thing to do with a flaming fuel tank is to drop it overboard. And so the problem of designing and constructing a fuel tank that could be instantly detached and released from an airplane at the will of the pilot has not failed to receive considerable attention. First in England, and later in France, actual tests have been carried out with encouraging results.

Various schemes have been worked out for detachable fuel tanks. Some depend on releasing a carriage which carries the tank, while others depend on the tripping of a latch. One of the French schemes for a detachable fuel tank is depicted in the accompanying illustration. The tank, in this case, is sort of wedge-shaped, and held in a wedge-shaped compartment by means of a simple latch device. The latch can be released from the cockpit, and the same operation shears all the pipe connections. Gasoline pipes coming from the gravity tank are previously closed off by a pet cock, or else automatically prevented from wasting fuel by a ball check valve.

As might well be expected, there are numerous objections to such an installation. The machine must be rearranged in most instances, resulting in some weaknesses. The fuel system must be altered, perhaps with detrimental results. The pilot is apt to release his tank without cause, due to nerves, resulting probably in a forced landing. In some cases, particularly the French Breguet bombers, tanks have become loose due to vibration. In a crash the detachable tank is just as likely to take fire as an ordinary tank. All in all, however, the detachable tank represents a distinct step forward in airplane design.

Then there are numerous schemes for protected tanks. The idea of covering a gasoline tank with India rubber originated with an Englishman, who took out a patent as far back as 1909. Various improvements have since been suggested, and a tank has finally been evolved which will take 20 or more incendiary bullets without leaking, and will not take fire even in a bad crash. One French inventor has developed a tank built of light steel with outer and inner walls, the intervening space being filled with glycerine and gelatine composition apparently similar to that which was at one time used as a filler for what were considered punctureproof tires. The composition is supposed to close and fill any hole made in this tank. However, the weight is so excessive that the tank has received little consideration.

Two French inventors have worked out a scheme calling for a steel tank of ordinary construction covered by a layer of felt and six or more layers of sheet rubber. One or more of the rubber sheets are separated by coarse interlaced hemp cord, and the whole constuction is bound in place by a galvanized wire netting. This tank has been provided with a funnel member at the bottom which gathers such fuel as escapes from the tank and percolates down through the layers of the cover. Tests have shown that this tank is fairly satisfactory, although its great weight is against it.

In the machines constructed in France for the United States Air Service, non-inflammable tanks were installed and at least one type of machine, namely, the Sopwith "Dolphin," was arranged for the non-pressure system. These tanks may be described as a semi-rigid type. Essentially, each tank consists of an inner metal shell of medium thickness, covered with fabric and layers of vulcanized rubber of varying degrees of elasticity and outer layers of fabric and a screen covering.

Practically all of the fireproof tanks in existence are based on the use of several layers of rubber or fabric in combination with metal. The idea is to accord a flexible construction which closes in after being perforated, and which can withstand severe shocks without breaking apart. Originally, the fireproof tank was intended wholly for fighting machines, and it is certain that if war had continued till this year, both sides would have employed

fireproof machines. As it is, the fireproof tank, both of the detachable and non-leaking types, has a decided peace application if airplanes are to be made safe.—*Scientific American*, Sept. 20, 1919.

THE FORMATION OF CLOUDS BY AEROPLANES.—As a result of certain observations it has recently been suggested that under favorable atmospheric conditions the passage of an aeroplane through the air can result in the formation of a temporary cloud more or less surrounding the machine. The creation of such a cloud appears perfectly reasonable, for given an appropriate degree of atmospheric humidity, it seems quite natural to expect that the local changes of pressure produced in the vortex and other disturbances in the air accompanying the flight of the machine would result in a temporary condensation of the atmospheric water vapor and the consequent formation of a "cloud." That the formation should be sufficiently marked to be observable at a distance, as apparently it has been observed, is we think, more to be wondered at than that the cloud should be formed. We learn that in the United States Army high-speed wind tunnel at Dayton the phenomenon has also been noticed on a small scale, and that it is being applied instead of the usual smoke or lycopodium powder method to make the flight vortices visible to the human eye and the lens of a camera.—*The Engineer*, Sept. 5, 1919.

LONG GLIDES.—What is believed to be a world's record for gliding with a dead motor was accomplished at Ithaca, N. Y., in a Thomas-Morse two-seater biplane. This machine flew to the head of Cayuga Lake, a distance of 35 miles, and having attained a height of 17,500 feet, the pilot switched off his motor and glided to Ithaca, at which point he still had 5000 feet altitude. If this glide had been continued it is estimated than an additional 15 miles could have been covered, making a total of 50 miles without the use of his motor. The longest glide previously recorded was that of Captain Raynham, according to *Aeronautics*, when he glided from Brooklands to Hendon, in England, a distance of 22 miles.—*Scientific American*, Sept. 27, 1919.

AEROPLANE TAKES OFF FROM SEA SLED.—The Navy Department conducted a series of successful tests of "taking off" from a sea sled. The plane was lowered from the deck of a battleship onto the sea sled. The sled got under way, gradually gaining full speed. Then the aeroplane engine was tuned up to full speed. The plane rose straight upward as if thrown from a catapult. The test was repeated several times with great success.—*Aerial Age Weekly*, Sept. 29, 1919.

MOORINGS FOR AIRSHIPS.—The mooring out of airships is a problem, writes Colonel W. L. Marsh in the London *Times*, of extreme importance. The first attempt in this direction was made in September, 1911, when his Majesty's naval airship *Mayfly* was brought out of her dock and moored to a mast on the Cavendish dock, Barrow-in-Furness. This mast was mounted on a raft and left free to swing with the wind. Attached to it was a screen in the form of a lattice made of rope to break the force of the wind.

The next development was a steel lattice-work mast. In this case, the top of the mast was a revolving cone, with its axis horizontal to the ground, into which the nose of the airship was led and securely fastened. Non-rigid airships tend to ride forward into the mast, and this, while being free to revolve, must be rigid. The envelope, however, must in some way be strengthened to resist the alternate pull and push of the anchorage. The ideal place for the attachment is the extreme point of the bow, but this is apt to break the nose-stiffeners which are fitted to reimburse the bow against the wind pressure in flight.

A mast has now been evolved comprising a vertical member at the top of which is a revolving pivot on a universal joint, carrying two horizontal

arms forming a complete semi-circle. At the extremity of each of these arms is a circular disc, in the center of which is a hoop on the end of a wire rope. Corresponding to these two discs are two fabric rings, with a hoop in the center of each, on either side of the bow of the airship.

In this way the airship is firmly held by the two arms while being left free to revolve like a weathercock in accordance with changes in the direction of the wind. The universal joint allows a certain amount of play and allows the airship some latitude for a pitching motion. The chief function of the two arms is to prevent rolling, which was bound to be considerable when only one point of attachment was used.

In the case of rigid airships, the problem is in reality simpler, as it is comparatively easy to reinforce the nose. Messrs. Vicker's method is to fit a stout steel bar to the nose-cap of the airship. This has a ball on the end, which by an ingenious device, automatically dips into a cup fitted in a universal joint on the top of the mast.

On landing to a mast the airship will be brought down to a height of about 200 feet and as close to the mast as possible with her head to the wind. The trail rope will then be dropped and attached by a spring clip to a hawser from the mast. The airship will then be hauled up to the mast by a winch until the steel ball meets the cup on the mast. The cup automatically closes, locking the airship fast, and the trail rope will be cast off from the hawser, the ship remaining attached simply by the grip of the cup. In this way, it is estimated that a large rigid airship could be landed with the assistance of not more than half a dozen men, thus doing away with the present landing parties of 250 men.—*The Nautical Gazette,* Sept. 20, 1919.

SOARS TO 34,200 FEET.—Roland Rohlfs soared to a new world's altitude record in his Curtiss *Wasp* at Roosevelt Field, Mineola, September 13. Rohlfs flew to a height of 34,200 feet, but because there were no officials present to seal his instruments the record is not official. The aviator is confident, however, he can repeat or better his performance under official auspices and promises soon to make a try at it.

The standing official altitude record is 38,136 feet, credited to Adjutant Casale of the French Army. In July, Rohlfs made an official flight of 30,700 feet. He was prevented from flying higher on that occasion by the chilling of his motor. Since then shutters have been fitted on the *Wasp's* radiator. Rohlfs's observations during the flight of September 13 disclosed a "temperature lid" at 34,000 feet. At that altitude his thermometer registered a minimum of 44 degrees below zero. Then it began to grow warmer, showing 40 degrees below at 34,200 feet.—*Aerial Age Weekly,* Sept. 22, 1919.

BAKELITE PROPELLERS UNDER TEST.—During the past few years there has been developed for various electrical uses, and also for certain parts of automobiles, a composition material called "Bakelite," after its inventor, Dr. Bakeland. So successful has this material proved that experiments are now being made with aeroplane propellers built of it. From the results thus far obtained, it is evident that these propellers have several advantages over those constructed of wood.

Bakelite is a harmless and particularly inert composition material derived from the combustion of carbolic acid, cresol, or phenol, and formaldehye. These, when combined in the proper manner, form a resin, which in its primary state may be either solid or fluid, but in either case is essentially a soft resin easily affected by heat and solvents. If subjected to combined heat and pressure for a sufficiently long time, however, the material is carried over into a hard state not affected by the ordinary solvents to temperatures that ordinarily would disintegrate a gum or resin. When in this condition bakelite is but slightly affected by acids or weak alkalies. It will not burn at all readily, but will char and burn slowly at temperatures in the region of 300 degrees to 400 degrees C.

Flat sheets of cloth or paper are coated with bakelite and pressed together to form solid blocks of various shapes.

The material, formed by coating a cloth or paper base with bakelite compound and pressing a number of these prepared sheets into a solid block, is known by the trade name of Micarta.

Wooden aeroplane propellers are subject to warping, splitting at the laminations, chipping, etc. Moreover, the various laminations in any one propeller are rarely of exactly the same moisture content when assembled, and their density also varies. This results in unequal absorption of moisture, particularly in cold weather.

Propellers made of micarta are practically impervious to moisture. They are also, if properly made, much more uniform in structure and are practically as strong as wood propellers, but slightly heavier.—Technical supplement to the *Review of the Foreign Press*, Aug. 19, 1919.

BRITISH REDUCE THEIR AIRSHIP PROGRAM.—A surprising development of the past year was the enormous scale upon which Great Britain launched her new aviation program. The proposed expenditure, which totalled the enormous sum of over $300,000,000, covered several airships which were to be larger and faster than anything that had yet been attempted. In addition to the governmental enterprises several large syndicates were formed for the purpose of promoting local, long distance and world travel, and the plans of these corporations, in the world both of finance and engineering construction, bordered on the sensational.

Since the announcement of these enterprises was made, strong pressure has been brought upon the British Government to exercise an all-around economy, and the pruning knife has already been taken in hand with most drastic results. In our last issue we showed what was being done in reducing the size and running expenses of the British Navy, 150 of whose ships have been condemned and stricken off the list, including practically the whole of the pre-dreadnought fleet. It is evident that the airship program is being cut down with an equally ruthless hand. The Air Ministry has decided to sell to private aviation firms a number of airships and also several airship stations, together with a large amount of stores.

That the curtailment is very severe will be realized when it is mentioned that among the numerous large airships to be sold is the one known as *R-80*, which has been nearly completed by Messrs. Vickers, and the huge *R-39*, which is being built by the Armstrong firm. Although the exact dimensions are not available *R-39* is much larger than any airship in the service, including the famous *R-34* which recently made the successful round trip from England to America and back. The government is so much in earnest in this matter that, if it is not possible to find purchasers, some of the airships, because of the heavy cost of maintenance, will be demolished. It is probable that those ships whose construction has not advanced very far will in any case be broken up. The necessity for cutting more deeply into airship program than into that for airplanes is due to the enormous first cost of the necessary landing grounds, air sheds and mooring posts which, so far as the air sheds alone are concerned, practically doubles the cost of each ship.

We are told that probably purchasers for several of the airships will be the syndicate which has been formed to establish air service between Liverpool and New York and between Liverpool and Australia, for if these services are to be maintained with any reasonable frequency and regularity, at least six of the larger type of airships must be built or purchased.

Of course we were all aware that the high first cost of the airship was a serious handicap; but it is not so well understood that its life is very limited. In the hearings before the House Naval Committee, its useful life was given, if we remember rightly, as about two years. That, of course refers to the machines of to-day, and is due chiefly to the perishable nature of the canvas covering. In any case those who pin their faith to the heavier-

than-air machines will feel that this drastic action of the British Air Ministry has discounted to some extent the airship and put a premium upon its smaller rival.—*Scientific American*, Oct. 4, 1919.

MISCELLANEOUS

SUBMARINE SCRAPPING.—After the destroyers, the submarine. Our present strength in under-water craft is not known exactly, but after the heavy toll of war losses, amounting to 54 vessels, it is manifest that the Admiralty order placing another 52 boats on the same list means drastic reduction, especially as we know now from Lord Fisher that when he returned to office in October, 1914, there were only 51 submarines in the whole service. Yet the reduction cannot be considered a bit too sweeping. In submarines, perhaps more than any other class, enormous developments must take place before the next naval war, and the service should not be encumbered with a lot of obsolete material, the retention of which could only lead to waste in money and men. The surprising thing is that 10 months should hav been allowed to elapse after the armistice before the scrapping of such old and small submarines as the 26 of the "B," "C" and "D" classes which appear in the new list. If these classes, *vide* Lord Jellicoe, were unfit for oversea work in 1914, they certainly must have been even more unfit in 1918, and they were surely not retained merely for coastal duties. Having at length moved in this matter the authorities have also included submarines of six later classes, several of them built during the war. The post-war flotillas will henceforth be composed entirely of vessels completed since 1914. The oil driven "J" and "L" types, and steam driven "K" class will form the backbone of the flotillas, with a proportion of older classes from the later "E's" onwards.—*The Army and Navy Gazette*, Sept. 20, 1919.

CIVIL ENGINEERS WANTED IN NAVY.—Young civil engineers who desire to become officers in the U. S. Navy have an excellent opportunity to secure an appointment in the grade of assistant civil engineer to fill existing vacancies. Appointees will be commissioned with the rank of lieutenant (junior grade), and there are at least 18 vacancies at present. A candidate who has passed his thirtieth birthday on December 15, 1919, or who has passed his twenty-first birthday on that date, will not be eligible for examination. The examination is open to all citizens of the United States, including reserve officers, temporary officers, and enlisted men of the navy who comply with conditions. The candidate must have received a degree from a college or university of standing, showing that he has satisfactorily completed a course in engineeering, and must have had not less than 16 months' practical experience since graduation. The Navy Department reserves the right to waive deficiencies as to age in the case of any officer who has satisfactorily performed duties in the Civil Engineer Corps during the war period. A descriptive circular will be sent to all persons interested upon application to the Chief of the Bureau of Yards and Docks, Navy Department, Washington, D. C.—*Army and Navy Journal*, Sept. 27, 1919.

GERMAN NAVY.—Berlin "Navy Orders" contain details of the new uniform to be introduced into the German Navy on November 1. The letters "S. M. S." (his Majesty's ship) will disappear from the men's cap-bands. Gilded buttons without the crown are to be worn, and a dagger will be the only weapon carried. The different colors of the velvet collar of officers' and warrant officers' uniforms, denoting the various branches of service, are to be done away with. The ranks of officers, pursers, and warrant officers will be shown by gold arm stripes, differing in number and width. Epaulettes are being abolished, but greatcoats will have shoulder-straps bearing the badges of rank. The wearing of the uniform is compulsory on duty only.—*The Army and Navy Gazette*, Aug. 30, 1919.

THE ALLIES ON THE RHINE.—The strength of the Allied Army of Occupation on the left bank of the Rhine has, it is announced in the Paris press, been fixed at 150,000 men, of which number France will find half. The remaining 75,000 will, it is stated, be found by Great Britain, Belgium and the United States. Belgium, as a conscription country, will probably find the biggest contingent, for under any system of voluntary service numbers are always a difficulty. M. Clemenceau stated recently before the Committee of the Chamber on the Peace Treaty, that the occupation will be for a maximum period of 15 years, and that the left bank and the right bank of the river for a depth of 50 kilometers will be completely demilitarized. With the German Army for the rest of the Empire reduced to 100,000 men it would seem that there is every prospect of the provisions of the Treaty being carried out.—*The Army and Navy Gazette,* Sept. 6, 1919.

MILITARY TRAINING FOR NEW YORK BOYS.—The work of calling up more than 100,000 boys in the state of New York who are 16, 17 and 18 years of age for military discipline and citizenship training was commenced October 1 by the State Military Training Commission, of which Major General John F. O'Ryan of the New York Guard, and who commanded the 27th Division, A. E. F., overseas, is chairman. Training is to begin immediately in all parts of the state under regular army and state guard officers and male teachers and physical instructors of various schools and colleges. The Bureau of Technical Military Training, in charge of Brig. General William H. Chapin, has direct charge of the training program. The state law makes it necessary for every boy of the ages mentioned to possess a certificate issued by the commission showing that he is meeting with the legal requirements. No school may permit a boy to attend unless he has a certificate and no employer may continue to employ a boy unless similarly provided.—*Army and Navy Journal,* Oct. 4, 1919.

PROPOSED JAPANESE-PACIFIC CABLES.—A recent dispatch from Tokyo states that prominent Japanese business men have decided to float a company with a capital of 50,000,000 yen (about $25,000,000) for the purpose of laying a cable line between the United States and Japan. This decision is the result of dissatisfaction which has been existing for a long time among business men on both sides of the Pacific with the present cable service, which seems unable to handle the constantly increasing volume of traffic.

It is expected that the venture will be supported by business men of the United States as well as by those in Japan, and that the establishment of a new cable line will do much towards promoting trade between the two countries.

"Some time ago a committee of business men formed to look into the matter of laying a cable between the United States and Japan," said K. Uchida, former Vice-Minister of Communications, who is the moving spirit in the proposition.

"It has not been decided as yet what route will be chosen for the cable, but we know it will be one of the two southern routes. One of these will run from San Francisco to Hawaii, to Midway, and to Ogasawarajima. The other will be the same with a substitution of one of the South Sea Islands, now under control of Japan, in place of Midway. The Hawaii route is the shorter, but the other gives a shorter distance between stations, which will enable it to do speedier work. No final decision will be made as to which of the two will be chosen until after a survey has been made."—*The Nautical Gazette,* Sept. 20, 1919.

CHINA BUILDING SHIPS.—In these days of planning for commercial prestige, even the Chinese are building ships. At Shanghai is a shipyard, the Kiangnan, operated by the government, which is turning out ships regularly, even though its capacity is limited, and the methods employed in many instances are antiquated.

Chinese directors are in charge of the plant, though the engineering problems are superintended mainly by Englishmen. The workmanship appears to be of high quality, and the vessels of the composite type which are constructed there are insured by Lloyd's for 20 years. In the last 10 years an average of 31 vessels a year have been turned out. Many have been for the use of the American Government in Philippine waters.—*N. Y. Times,* Oct. 5, 1919.

POLAND TO HAVE A NAVY WHEN TREATY IS RATIFIED.—The organization of a Polish Navy, to become operative with the ratification of the Peace Treaty, is proceeding rapidly, according to advices from Polish sources. The fleet will consist, according to present plans, of four armored cruisers and 12 large torpedo-boats. It will have a personnel of 3500, including 150 officers, probably under the command of Admiral Porebski.—*N. Y. Times,* Sept. 20, 1919.

JAPAN'S NAVY MANEUVERS.—Coincident with the return of the Emperor and Empress from Nikko, it was announced that extensive naval maneuvers would be carried out by the entire Japanese Navy, with the exception of ships in distant waters, in the Pacific Ocean off the Southeastern coast of Japan, beginning the middle of October.

The maneuvers will be under the personal supervision of the Emperor, this being the first time that he has been in charge of evolutions on the high seas. It is understood Japan will appropriate $125,000,000 for aviation, the program to be extended over four years.—*N. Y. Times,* Sept. 28, 1919.

CHASERS RACE FROM BERMUDA.—Six submarine chasers, 110-footers, on their way from foreign bases raced from off St. Davids Head to a line off the Statue of Liberty and made a fine contest. Vice Admiral Morgan Singer, R. N., sent the racers away at five o'clock on Saturday afternoon, August 16. The Admiral and his party were on the government tub *St. Abbs* and a large fleet of vessels of all types went outside to see the chasers start.

A tender, *Hannibal,* left Bermuda 24 hours before the race started and she was passed by the leaders 36 hours after the start. Lieutenant Joseph L. Day of Portland, Me., had charge of the *S. C. 131* and he succeeded in getting his vessel first across the line and maintaining the lead all the way. The Ambrose Channel Lightship was hailed at at 2.19 o'clock on Tuesday morning, August 19, and the finishing line was crossed at 2.53. The actual time from start to finish, allowing for difference in time, was 57 hours, 20 minutes. The *S. C. 217* finished at 3.01 o'clock and *S. C. 351* at 3.34 o'clock. *S. C. 90, S C. 224* and *S. C. 237* followed in the order named.

Lieutenant Day said, "We ran into what was rough water for us right at the start, which held until we reached the Gulf Stream the next day. Going with the current we found practically smooth seas in what we expected would be a nasty spot. On Monday the weather was fine until evening, when the racers ran into fog and later they raced through a terrific electrical storm. It was hard work to pick up the Navesink Light, but we did so finally at 11.30 o'clock."

The best previous record over this course but going to Bermuda was made by the *Ailsa-Craig* in 1907. That yacht, with a 100-h. p. Craig engine, made the 42 nautical miles in 64 hours, 21 minutes. The 110's have three Standard engines of 225 h. p. each.—*The Rudder,* Sept., 1919.

100 OFFICERS AND SAILORS OF NAVAL SHIP DIE IN TYPHOON.—Lining up on the deck and crying "Banzai!" more than 100 officers and seamen of the Japanese naval oil supply ship *Shijiki Maru* went down with their ship in a typhoon off the Island of Kyushu.

According to the stories of eight survivors, the *Shijiki Maru* ran on the rocks during the typhoon, and in a dense fog. Warships are engaged in the search for possible survivors, who may be found on the island.—*N. Y. Times,* Sept. 11, 1919.

THE FIRST SUBMARINE VICTIM.—In the course of his extremely interesting narrative of the Dover Patrol in the *Daily Telegraph,* Admiral Sir Reginal Bacon mentions that the submarine menace made a heavy call on our available destroyers, "especially when such vessels began indiscriminately sinking merchant vessels on October 21, 1914." The country may not remember that it was so early in the war that Germany began destroying merchantmen in this way. The first submarine blockade was not proclaimed until February 18, 1915, but for four months the "U"-boats had been trying their hands at the new game of piracy. The promptness with which this method of commerce destruction was taken up, as soon as boats were available for it, shows clearly that it was premeditated, but the earliest sinkings attracted little public attention and no one could have foreseen the lengths to which the submarines would go. Although, as a calculated insult, it was intended to sink the first British merchantman on Trafalgar Day, the incident actually occurred on October 20, 1914, the news reaching England next morning. It was the steamer *Glitra,* of 866 tons, owned by Messrs. Salvesen, of Leith, and commanded by Captain R. E. Johnston, which was destroyed, *U-17* lying in wait for her while she was bound with a general cargo from Grangemouth to Stavanger. The submarine flew the German flag and the *Glitra* tried to escape, but her speed was too slow and she therefore complied with the signal to stop.—*Army and Navy Gazette,* Sept. 20, 1919.

SKODA WORKS NATIONALIZED; CZECHS AND FRENCH TO DIRECT.—The famous Skoda arms and ammunition works, near Pilsen, have been nationalized, according to messages reaching here. A new council has been named to conduct the works, comprised of six Czechs and three Frenchmen.

The last previous advices regarding the Skoda works were that their purchase was being negotiated for by an American syndicate. A Geneva dispatch on August 31, however, said that there was a hitch in the negotiations due to the differences on the question of the price to be paid.

The Skoda works produced the famous Austrian howitzers, one of the most effective heavy artillery weapons used by the Central Powers in the war.—*N. Y. Times,* Sept. 29, 1919.

MAKING SAFE THE HIGH SEAS.—One of the most welcome signs of peace for those who travel the high seas, has been the removal from merchant ships of guns, gun platforms, lookout-nests and the bizarre camouflage and their restoration to peace-time conditions. Not only does the passenger embark on a ship which has been restored her external grace and internal comfort, but she can steam on a direct course for her destination without fear of the bursting shells of the enemy raider, or the rending of her hull by a torpedo.

Not all of the war terrors were swept away, however, with the signing of the armistice; for, although the enemy might no longer sow the seas, the roadsteads, and the channels of maritime commerce with the deadly mine, the seas as he left them, were full of this peril. The Allies, of course, did their own share of mine planting; but since they possessed the charts of the mine-fields, the peril was limited. The enemy also was required by the armistice to furnish full plans of his activities.

The work of mine removal has been a simply stupendous task, the largest part of which was the clearing away of the great mine barrage, 250 miles in length, which was laid by our own and British navies. The greater share of the task, involving the laying of between 50,000 and 60,000 mines, fell to

us, and to us was allotted the task of their removal, which in its way, was scarcely less full of peril and less burdensome than the work of putting them down. However, according to dispatches from London, the work has now been completed and we are given credit for its rapid accomplishment. Unquestionably, our North Sea mining operations, including manufacture of the mines in this country; their transport to Scotland; the formation of a great mine laying fleet; the laying of the mines and their remarkably speedy removal, will always be set down as one of the major operations of this great war.—*Scientific American,* Oct. 4, 1919.

WANTED—A BOLIVIAN PORT ON THE PACIFIC.—The government of Bolivia has made a demand on the League of Nations for an outlet to the Pacific. The Port of Arica, the terminus of the Trans-Andean railroad from La Paz, the Bolivian capital, is the port most desired. This port belongs to the Peruvian provinces of Tacna and Arica, which were seized by Chile in a dispute with Peru in 1883.

Arica is connected with the city of Tacna, the capital of the province of that name, as well as with the Bolivian capital. Formerly it was the exporting center for a large number of Andean mining camps, silver, copper and maganese ores being shipped in large quantities. Now, it chiefly handles the exports of Bolivia. These consist chiefly of chinchilla skins, alpaca wool and other agricultural products. Loading and unloading of vessels is effected by lighters in an open roadstead behind the island of Alacran. The trade of the port has not yet rendered it necessary to go to the expense of constructing breakwaters and forming an artificial harbor.

Although the Bolivian Government has filed a claim for the port of Arica, it does not expect action to be taken until the pending dispute between Peru and Chile with respect to the provinces of Arica and Tacna is settled. According to the terms of the settlement of the war between these two countries, Chile had to restore the provinces to Peru, but now that the time to do so has arrived, the Chilean Government refuses to relinquish its hold. It has, however, agreed to refer the dispute to the peoples of the provinces. Meanwhile Bolivia is permitted to use the port of Arica freely. Its trade is prospering, according to latest advices.—*Shipping,* Sept. 27, 1919.

CURRENT NAVAL AND PROFESSIONAL PAPERS

The Low Visibility Phase of Protective Coloration. By Loyd A. Jones. *Journal of the Franklin Institute,* Sept., 1919.

Radio Direction Finding Apparatus. By A. S. Blatterman. *Journal of the Franklin Institute,* Sept., 1919.

The U. S. Navy Transatlantic Flight. By Henry Renterdahl. *Scribner's Magazine,* October, 1919.

Our Restored Merchant Marine. By T. M. Knapper. *Review of Reviews,* October, 1919.

Universal Training for National Service. By John Erskine. *Review of Reviews,* October, 1919.

The Victory at Sea. II. The Adoption of the Convoy. By Rear Admiral William S. Sims, U. S. N. *World's Work,* October, 1919.

Results of the Blockade Upon Germany. By Alonzo C. Taylor. *World's Work,* October, 1919.

The German Conception of the Freedom of the Seas (Extracts from German sources). By Amos S. Hershey. *American Journal of International Law,* April, 1919.

The Strategic Value of Shantung. By Arthur Judson Brown. *Asia,* October, 1919.

How Tirpitz Ruined the German Fleet. By Captain Persius (translated). *Journal of the Royal United Service Institute,* August, 1919.

The Influence of the Submarine in Naval Warfare of the Future. By Lieutenant W. S. King-Hall, R. N. (Prize Essay). *Journal of the Royal United Service Institute*, August, 1919.

The Beginnings of Submarine Warfare. By Col. C. Field. *Journal of the Royal United Service Institute*, August, 1919.

Belgium and Holland and the Freedom of the Scheldt. By Emile Cammaerts. *The Nineteenth Century and After.*

The Grand Fleet (A Study of Operations including Jutland). By Captain Romeo Bernotti. *Rivista Marittima* (Italy).

ANNOUNCEMENTS

Chas. Cory & Son, Inc., main office & factory at 290 Hudson Street, New York, N. Y., have announced the opening of a new branch at 207 Market Street, Philadelphia, in order that their ships' electrical installation and repair, and mechanical communicating work may be more expeditiously handled in the Philadelphia district. The Cory Company announces that it will carry in its Philadelphia branch a complete stock of marine electrical appliances and mechanical communication apparatus which will be available for immediate deliveries.

Mr. H. W. Philbrook, formerly with the General Electric Company of Schenectady, has been appointed district manager of the Schutte & Koerting Company's New York office, 50 Church Street. The Schutte & Koerting Company have lately issued a pamphlet entitled "Our Part in the War," and will take pleasure in mailing a copy to those applying for same.

DIPLOMATIC NOTES

FROM SEPTEMBER 15 TO OCTOBER 15

PREPARED BY

ALLAN WESTCOTT, Associate Professor, U. S. Naval Academy

RATIFICATION OF THE PEACE TREATY

FRENCH CHAMBERS RATIFY TREATY.—Following the ratification of the Peace Treaty by the French Chamber of Deputies, the French Senate opened debate on the treaty October 7 and ratified both the treaty and the Franco-British and Franco-American agreements on October 11 by a large majority. The ratification of the treaty by Great Britain and France left it necessary for only one other of the great powers to ratify in order to put the treaty into effect.

KING OF ITALY ISSUES DECREE APPROVING TREATY.—On October 7 King Victor Emanuel of Italy issued a decree authorizing the government to execute the peace treaties with Germany and Austria, and at the same time setting forth that the decree be presented to Parliament to be converted into law. Since elections for Parliament take place in Italy on November 16, and since the new Parliament will not meet until December, Italy's ratification of the treaty cannot be completed until that month.

EMPEROR MAY RATIFY FOR JAPAN.—Paris, October 8.—Ratification by the Japanese Parliament of the German Peace Treaty is not required by the Constitution of Japan, according to information from Peace Conference circles. Signature by the Emperor after consultation with the private diplomatic council constitutes the necessary ratification, and this is expected to be effected by October 15.

If two others of the five great powers have communicated the official announcement of ratification to the French Foreign Office by that time, or if the governments of France and Great Britain have joined the sovereign of Italy in completing the forms of ratification before, a *proces verbal* will then be drafted by the French Foreign Office stating that the documents have been deposited there, and the date of this document will be that on which the treaty will come into force.

The state of war will be at an end from the date of the *proces verbal*, and, with the reservations stipulated in the treaty, official relations will then be resumed between the allied and associated powers and Germany.

Directly after the Versaills Treaty has come into force, the Council of the League of Nations is required to meet in order to intervene immediately in a certain number of urgent questions, such as the appointment within a fortnight of members of the commissions to delimit the frontiers of Sarre district and Danzig.—*N. Y. Times*, 9/10.

PEACE TREATY DEBATE IN U. S. SENATE.—On October 2 the Fall Amendments to the Peace Treaty, which would have barred American representation on the various commissions created in the document, were defeated by a vote in which those opposed to the amendments received a majority rang-

ing from 5 to 10 over those in favor. On October 16 the Shantung Amendments, providing for the transfer of Japan's privileges to China, were defeated by a vote of 55 to 35.

During the week ending October 12 insistent efforts were made by "middle ground" senators to persuade Democratic leaders to agree upon compromise reservations to the Leage of Nations Covenant, in order that the entire treaty might not be defeated. The administration senators held out against any compromise that involved sending the treaty back to the Peace Conference, and threatened themselves to vote against a ratifying resolution in which "killing reservations" were made.

GERMANY

ALLIES INSIST ON EVACUATION OF BALTIC PROVINCES.—In the third week of September the Paris Supreme Council sent a note to Germany renewing its demand that German troops evacuate Courland and other Baltic provinces formerly a part of Russia. In reply on October 5 the German Government stated that it had recalled General von der Goltz, commander of the German troops in the Baltic provinces, had stopped pay, supplies, and munitions on September 25, and had thus exhausted its means of coercion. It suggested that an Allied commission should be sent to the Baltic to verify these facts. On October 10, Marshal Foch was directed to renew the Allied demand and to place upon the German Government entire responsibility for its execution.

German reports of the same date stated that the greater part of General von der Goltz's army, variously estimated to number from 35,000 to 60,000, was leaving the provinces. But on October 11 came news to the effect that German forces in cooperation with Russians had occupied the port of Riga and compelled Lettish troops to evacuate the city.

GERMANY GIVES UP AUSTRIAN UNION.—Paris, September 21.—Baron Kurt von Leersner, President of the German Peace Delegation at Versailles, to-morrow afternoon at 4 o'clock will sign the protocol annulling Article 61 of the German constitution, as demanded by the Peace Conference. The signing will take place at Versailles and will be private. Jules Cambon of the French Peace Mission will be the only Allied representative present.

Article 61 of the German constitution would have given Austria representation in the German Parliament. The Supreme Council declared that this provision was contrary to the stipulations of the Versailles Treaty.—*N. Y. Times*, 22/9.

ITALY

D'ANNUNZIO AT FIUME.—On September 13, Gabriele d'Annunzio, the poet-aviator, entered Fiume with about 2300 troops and 40 motor lorries, the 6th Italian Army Corps which was in the city refusing to prevent his entry and for the most part joining his undertaking. General Badoglio, Deputy Chief of Staff of the Italian Army, was at once sent to Fiume with full powers, but failed completely to bring the troops within the city under government control. The French and British garrisons for the most part withdrew on September 15.

Upon news of the Fiume coup, Foreign Minister Tittoni at once returned from Paris to Rome. The Italian Government, condemned the action of the rebellious troops, and instituted a blockade of Fiume. On October 4, however, food was allowed to enter the city, and only a loose military blockade was continued. D'Annunzio's forces at the time numbered from 25,000 to 30,000, occupying the city itself, the Jugo-Slav suburb of Sussak, and the country behind to a distance of about six miles. Though on the verge of hostilities with the Jugo-Slavs, the Italian leader early in October issued a message to the effect that while the Adriatic was "an Italian sea" the Slavs would be conceded full commercial privileges.

ITALY'S POLICY DEPENDENT ON COMING ELECTION.—On September 29 the Italian Parliament was dissolved, the new Parliament to assemble about December 1 following elections on November 16. In the interim it was believed that the Nitti Cabinet would hold over and take no decisive action. Hope of a peaceful settlement of the Fiume question rests on the defeat of the militarists and nationalists in the coming election. Otherwise, unless Fiume is in the meantime given to Italy by the Peace Conference, it will be annexed by Italy without regard to the wishes of the powers.

AMERICAN FORCES LANDED AT TRAU.—On September 26 the Secretary of the Navy announced that a force from the U. S. S. *Olympia* had landed and taken control of the port of Trau, on the Dalmatian coast, which had been occupied by Italians and which was evacuated without hostilities upon the landing of the American forces. It was stated that the action of Rear Admiral Philip Andrews, in ordering this move, had been authorized by the Supreme Council.

On September 29 two resolutions were introduced in the Senate and referred to committees, one condemning the action of the Supreme Council and the other merely calling upon the State Department for information. It was unofficially pointed out that the Dalmatian coast was enemy territory surrendered by Austria, not yet disposed of by the Peace Conference, and pending its decisions still under the trusteeship of the Allies. Until a settlement was reached, United States naval forces were assigned the duty of maintaining order on a part of the coast, and resisted the seizure of Trau as in violation of the terms of the temporary arrangement.

BELGIUM AND HOLLAND

DISPUTE OVER LIMBURG AND CONTROL OF SCHELDT.—On September 21 press despatches stated that a diplomatic rupture between Holland and Belgium threatened as a result of Belgium's insistent demand that the frontier be altered so as to give her control of a small strip of the Dutch province of Limburg lying between Belgium and Germany, and also of Dutch territory south of the Scheldt. Domination of the southern bank of the Scheldt would secure Belgium against a Dutch blockade of the river mouth in time of war and against trade aggression in time of peace.

BULGARIA

PEACE TERMS TO BULGARIA.—The treaty of peace between the Allied and Associated Powers and Bulgaria was presented to the Bulgarian mission at the French Foreign Office, Paris, on September 19, the American representative in Paris, Assistant Secretary of State Frank L. Polk, taking part in the proceedings.

The terms of the treaty are officially summarized as follows: Bulgaria cedes Western Thrace (her booty after the Balkan wars) to the Allied and Associated Powers, with the understanding that she will accept whatever disposition of this territory the powers ultimately decide upon. Bulgaria also accedes to four slight rectifications of the Serbian frontier. It is understood that Bulgaria will be guaranteed an economic outlet to the Ægean, and that the question of her securing territory in the Dobrudja of Bulgarian population will be taken up later. The army must be reduced to 20,000 within three months, and about $500,000 must be paid by way of reparation.

It will be seen that while the question of Bulgaria's Ægean outlet, upon which President Wilson was inclined to insist, remains unsolved, Bulgaria suffers less severely in the peace settlement than her Teutonic allies.

TURKEY

NEW MINISTRY LESS AMENABLE TO ALLIES.—The Turkish Cabinet formed under Damad Ferid Pasha to make peace with the Allies was forced to resign on October 5 and was succeeded by a new Ministry under General Ali Riza Pasha. The change is said to have been brought about by General Mustapha Kemal, a Nationalist and "Young Turk" leader, who had established a rival government at Erzerum and occupied the railroad center of Konieh in Asia Minor. By the shift of ministry it is possible the government may come to terms with this faction. Turkey, it is thought, sees in the unsettled policy of the Western Powers an opportunity to alter to her advantage the severe terms which have been proposed for her at Paris.

RUSSIA

ADVANCE OF ANTI-BOLSHEVIK FORCES.—Despatches of October 6 reported that Polish troops, after two days' hard fighting, had captured Dvinsk, on the old Russo-Polish frontier.

General Denikin's forces, which already controlled great areas of southern Russia, were on the same date within 30 miles of the city of Orel, about 200 miles south of Moscow. Kolchak's forces, during their September offensive, advanced their front an average distance of 75 miles.

Simultaneously with this renewal of the offensive by Kolchak, and in spite of the withdrawal of Allied forces from northern Russia, the anti-Red troops in the Archangel district undertook offensive operations toward Petrograd.

In the meantime the Red government at Moscow was reported to have sent a wireless message renewing its offer to make peace on the same terms as those offered in the notorious Bullitt Report.

GERMANY INVITED TO JOIN BLOCKADE.—London, October 16 (Associated Press).—The text of the note of the Supreme Council inviting Germany to participate in the blockade of Russia, as published by the *Berlin Tageblatt* and reprinted by *The Daily Herald,* shows that Sweden, Norway, Denmark, Holland, Finland, Spain, Switzerland, Mexico, Chile, Argentina, Colombia, and Venezuela also have been invited to initiate measures to prevent their nationals from engaging in any trade with Bolshevist Russia. The measures are thus enumerated:

First.—Refusal of permission to sail to every ship bound for a Russian Bolshevist port and the closing of all ports to ships from Bolshevist ports.

Second.—Similar regulations to be adopted with regard to all goods destined for Russia by any other route.

Third.—Passports will be refused to all persons to or from Bolshevist Russia. Isolated exceptions may be made by agreement of the allied and associated powers.

Fourth.—Measures will be taken to hinder the banks from granting credit to commercial undertakings in Bolshevist Russia.

Fifth.—Every government will refuse its nationals any facilities of intercourse with Bolshevist Russia, whether by post or wireless telegraphy.

Marshal Foch added the following instruction:

"Inform the German Government that the British and French men-of-war in the Gulf of Finland will continue to blockade Bolshevist ports and detain from the moment they come in sight ships bound for Bolshevist ports."

The preamble to the note declares that the open enmity of the Bolsheviki is directed against all governments and that programs of international evolution, circulated by them, constitute a grave danger to the national security of all the powers. Every increase in the capacity of the Bolsheviki for resistance increases this danger, and it would be desirable that all nations wishing peace and the re-establishment of social order should unite together to resist Bolshevist Government.

For this reason, it is further declared, the allied and associated governments, after raising the blockade of Germany, have refused permission to their subjects to resume commercial relations with Bolshevist Russia.

The German Government is requested to take measures in conformity with those enumerated.—*N. Y. Times,* 17/10.

FAR EAST

UNITED STATES PROTESTS AGAINGST CONDUCT OF JAPANESE IN SIBERIA.—Tokio, October 9.—Orders have been issued by General Oi, commanding the Japanese forces in Eastern Siberia, directing his men to cooperate effectively with American authorities in the operation of the Trans-Siberian Railroad.

This is a result of strong representations made by the United States to the Japanese Government, claiming that in sections guarded by Japanese troops the lives and property of Americans have not been adequately protected. In the event that cooperation by the Japanese troops could not be secured, it is said, the note hinted American forces would be withdrawn from Siberia, and the reason for the step would be made public at Washington.

Reports state the American note was very frank in discussing the situation in Siberia and to have expressed the fear, by inference, that the policy of Japan there might be open to criticism as being opposed to the "new idea of international co-operation." It is understood a copy of the note of the Washington government, which was delivered in September, has been forwarded to Great Britain and France, and probably Italy and China.

Japanese officials seem inclined to minimize the gravity of the situation, and declare they have not been supporting General Semenoff, anti-Bolshevist leader, whose activities have occasioned concern in Allied circles. They are said to express belief that the question is open to early and amicable adjustment.—*N. Y. Times,* 10/10.

REVIEW OF BOOKS
ON
SUBJECTS OF PROFESSIONAL INTEREST

"Radio Instruments and Measurements." (Circular No. 74, Bureau of Standards.) Printed by the Wireless Press, New York, N. Y.

A compilation of radio information, especially as to measurements, intended for use of advanced students and radio engineers.

In its previous editions it has been found of the greatest value as a reference work in the radio course at the Naval Academy and in the compilation of a radio text-book for midshipmen.

While the book devotes 36 pages to the fundamentals of Electromagnetism and the Principles of Alternating Currents and leads up logically to Measurements, with unusually full mathematical theory, it is not, nor is it intended to be, a book suitable for use as a text-book.

Part I covers the Theoretical Basis of Radio Measurements. The Fundamentals of Electromagnetism. The Principles of Alternating Currents. Radio Circuits. Damping.

Part II. Instruments and Methods of Radio Measurements. Wave Meters. Coils. Current Measurements. Resistance Measurement. Sources of High-frequency Current.

Part III. Formulas and Data. Calculation of Capacity. Calculation of Inductance. Design of Induction Coils. High-frequency Resistance. Miscellaneous Formulas and Data.

B. C. A.

"New Words Self Defined." By C. Alphonso Smith, Head of the Department of English, U. S. Naval Academy. Price $1.25. (Doubleday, Page & Co.)

This attractive little volume does something new in the way of word definition. Instead of offering a synonym of the word or a definition of it in the style of a dictionary, Dr. Smith quotes one or more passages from newspapers, magazines, and books, in which the expression is used in such a way as to leave no doubt as to its meaning and the peculiar twist of its usage. The words simply define themselves. This is the most illuminating method of getting at the meaning provided the passage quoted is clear and comprehensive, but it must have been no easy task to hit on a satisfactory quotation for every instance.

Not all the words are new. "Gadget," "limey," "First Luff," and "padre," for example, are old in naval tradition. And "doughboy," as a footnote explains, goes back as a word to as early as 1685, and its application to the American soldier to our Civil War. Nor can "Amerind" be classed with the atrocities of the late war, because it was manufactured by a convention

of ethnologists several years ago as the scientific name for our red man. But most of these older words gained a far wider currency than ever before through the popular literature of the recent world conflict.

The great bulk of the words in this book, however, are new—the coinage of the soldiers and sailors, French as well as English and American. Every newspaper and magazine article bristled with them after 1914. Probably not one-tenth of them will survive 10 years hence because they are slang and slang dies easily. But they are more interesting than ordinary slang because they reflect the humor of the trench, the airplane, and the forecastle during the greatest war the world has known. They are a part of the human interest in the story of that war and therefore worth preserving.

Many also reveal interesting derivations. The famous "scrap of paper" phrase, for instance, quoted so often to the confusion of Herr von Hollweg, proves to have been in itself a quotation from Bismarck: "Treaties are scraps of paper. All depends on the manner of turning them to account."

To a future reader of the literature of the war, Dr. Smith's book will be invaluable; and even the reader of to-day, who followed every stage of the war, will find a host of words clarified for him which he has hitherto understood, if at all, only imperfectly.

W. O. S.

More members, both regular and associate, are much desired. Any increase in membership invariably means larger number of papers and essays submitted, and consequently an improvement in the PROCEEDINGS.

You are requested to send or give the attached slip to some one eligible for membership, urging him to join.

By direction of the Board of Control,

S. A. TAFFINDER,
Secretary-Treasurer.

Attention is invited to extracts from the constitution on the opposite page as to the requirements in making applications for life, regular and associate membership.

.....

.....*191*

To the Secretary and Treasurer,
U. S. Naval Institute,
Annapolis, Md.

Dear Sir:

Please enroll my name as a { *regular* / *associate* } *member of the U. S. Naval Institute from*.....

Very truly yours,

.....

.....

Members and associate members are liable for the payment of the annual dues until the date of the receipt of their resignation in writing. Annual dues $2.50.

NOTICE

The U. S. Naval Institute was established in 1873, having for its object the advancement of professional and scientific knowledge in the Navy. It is now in its forty-sixth year of existence, trusting as heretofore for its support to the officers and friends of the Navy. The members of the Board of Control cordially invite the co-operation and aid of their brother officers and others interested in the Navy, in furtherance of the aims of the Institute, by the contribution of papers and communications upon subjects of interest to the naval profession, as well as by personal support and influence.

On the subject of membership the Constitution reads as follows:

ARTICLE VII

Sec. 1. The Institute shall consist of regular, life, honorary and associate members.

Sec. 2. Officers of the Navy, Marine Corps, and all civil officers attached to the Naval Service, shall be entitled to become regular or life members, without ballot, on payment of dues or fees to the Secretary and Treasurer. Members who resign from the Navy subsequent to joining the Institute will be regarded as belonging to the class described in this Section.

Sec. 3. The Prize Essayist of each year shall be a life member without payment of fee.

Sec. 4. Honorary members shall be selected from distinguished Naval and Military Officers, and from eminent men of learning in civil life. The Secretary of the Navy shall be, *ex officio*, an honorary member. Their number shall not exceed thirty (30). Nominations for honorary members must be favorably reported by the Board of Control. To be declared elected, they must receive the affirmative vote of three-quarters of the members represented at regular or stated meetings, either in person or by proxy.

Sec. 5. Associate members shall be elected from Officers of the Army, Revenue Cutter Service, foreign officers of the Naval and Military professions, and from persons in civil life who may be interested in the purposes of the Institute.

Sec. 6. Those entitled to become associate members may be elected life members, provided that the number not officially connected with the Navy and Marine Corps shall not at any time exceed one hundred (100).

Sec. 7. Associate members and life members, other than those entitled to regular membership, shall be elected as follows: "Nominations shall be made in writing to the Secretary and Treasurer, with the name of the member making them, and such nominations shall be submitted to the Board of Control. The Board of Control will at each regular meeting ballot on the nominations submitted for election, and nominees receiving a majority of the votes of the board membership shall be considered elected to membership in the United States Naval Institute."

Sec. 8. The annual dues for regular and associate members shall be two dollars and fifty cents, all of which shall be for a year's subscription to the UNITED STATES NAVAL INSTITUTE PROCEEDINGS, payable upon joining the Institute, and upon the first day of each succeeding January. The fee for life membership shall be forty dollars, but if any regular or associate member has paid his dues for the year in which he wishes to be transferred to life membership, or has paid his dues for any future year or years, the amount so paid shall be deducted from the fee for life membership.

ARTICLE X

Sec. 2. One copy of the PROCEEDINGS, when published, shall be furnished to each regular and associate member (in return for dues paid), to each life member (in return for life membership fee paid), to honorary members, to each corresponding society of the Institute, and to such libraries and periodicals as may be determined upon by the Board of Control.

The PROCEEDINGS are published monthly; subscription for non-members, $3.00; enlisted men, U. S. Navy, $2.50. Single copies, by purchase, 30 cents; issues preceding January, 1919, 50 cents.

All letters should be addressed U. S. Naval Institute, Annapolis, Md., and all checks, drafts, and money orders should be made payable to the same.

More members, both regular and associate, are much desired. Any increase in membership invariably means

SPECIAL NOTICE

NAVAL INSTITUTE PRIZE ESSAY, 1920

A prize of two hundred dollars, with a gold medal, and a life-membership (unless the author is already a life member) in the Institute, is offered by the Naval Institute for the best original essay on any subject pertaining to the naval profession published in the PROCEEDINGS during the current year. The prize will be in addition to the author's compensation paid upon publication of the essay.

On the opposite page are given suggested topics. Essays are not limited to these topics and no additional weight will be given an essay in awarding the prize because it is written on one of these suggested topics over one written on any subject pertaining to the naval profession.

The following rules will govern this competition:

1. All original essays published in the PROCEEDINGS during 1919, which are deemed by the Board of Control to be of sufficient merit, will be passed upon by the Board during the month of January, 1920, and the award for the prize will be made by the Board of Control, voting by ballot.

2. No essay received after November 1 will be available for publication in 1919. Essays received subsequent to November 1, if accepted, will be published as soon as practicable thereafter.

3. If, in the opinion of the Board of Control, the best essay published during 1919 is not of sufficient merit to be awarded the prize, it may receive "Honorable Mention," or such other distinction as the Board may decide.

4. In case one or more essays receive "Honorable Mention," the writers thereof will receive a minimum prize of seventy-five dollars and a life-membership (unless the author is already a life member) in the Institute, the actual amounts of the awards to be decided by the Board of Control in each case.

5. It is requested that all essays be submitted typewritten and in duplicate; essays submitted written in longhand and in single copy will, however, receive equal consideration.

6. In the event of the prize being awarded to the winner of a previous year, a gold clasp, suitably engraved, will be given in lieu of the gold medal

By direction of the Board of Control.

S. A. TAFFINDER,
Commander, U. S. N., Secretary and Treasurer.

TOPICS FOR ESSAYS

SUGGESTED BY REQUEST OF THE BOARD OF CONTROL

"Duties and Responsibilities of Subordinates with Special Reference to the Relations between Commanders-in-Chief and Chief of Naval Operations; Commanders-in-Chief and Force Commanders; Force Commanders and Division Commanders."

"Initiative of the Subordinate—Its True Meaning."

"Military Efficiency Dependent upon National Discipline."

"Governmental Organization for War."

"Naval Gunnery, Now and of the Future."

"Naval Policies."

"The Place of the Naval Officer in International Affairs."

"Moral Preparedness."

"Tact in Relation to Discipline."

"The Principles of Naval Administration in Support of War-Time Operations."

"Responsibilities and Duties of Naval and Military Officers of the United States in Educating and Informing the Public on Professional Matters."

"A Commission in The Navy: Its Meaning and the Obligations Which It Involves."

"The Relations of an Officer to his Subordinate, Both Commissioned and Enlisted."

"The True Meaning of the Expression 'An Officer and a Gentleman.'"

"Seen in the Light of Recent Events, What Should Be the United States Navy of the Future as Regards Types and Numbers of Ships."

"Probable Future Development of Surface-craft, Air-craft and Submarines and the Relation of these Types to Each Other and to Naval Warfare in General."

"The Grand Strategy of the Great War, with Especial Reference to Coördination, and Lack of Coördination, Between Naval and Military Forces."

"The Problems of Overseas Operations in the Light of Recent Developments."

"The Influence of Sea Power upon History as Illustrated by the Great War."

LIST OF PRIZE ESSAYS

"WHAT THE NAVY HAS BEEN THINKING ABOUT"

1879

Naval Education. Prize Essay, 1879. By Lieut. Commander A. D. Brown, U. S. N.

NAVAL EDUCATION. First Honorable Mention. By Lieut. Commander C. F. Goodrich, U. S. N.

NAVAL EDUCATION. Second Honorable Mention. By Commander A. T. Mahan, U. S. N.

1880

"The Naval Policy of the United States." Prize Essay, 1880. By Lieutenant Charles Belknap, U. S. N.

1881

The Type of (I) Armored Vessel, (II) Cruiser Best Suited to the Present Needs of the United States. Prize Essay, 1881. By Lieutenant E. W. Very, U. S. N.

SECOND PRIZE ESSAY, 1881. By Lieutenant Seaton Schroeder, U. S. N.

1882

Our Merchant Marine: The Causes of Its Decline and the Means to Be Taken for Its Revival. "Nil clarius aquis." Prize Essay, 1882. By Lieutenant J. D. Kelley, U. S. N.

"MAIS IL FAUT CULTIVER NOTRE JARDIN." Honorable Mention. By Master C. G. Calkins, U. S. N.

"SPERO MELIORA." Honorable Mention. By Lieut. Commander F. E. Chadwick, U. S. N.

"CAUSA LATET: VIS EST NOTISSIMA." Honorable Mention. By Lieutenant R. Wainwright, U. S. N.

1883

How May the Sphere of Usefulness of Naval Officers Be Extended in Time of Peace with Advantage to the Country and the Naval Service? "Pour encourager les Autres." Prize Essay, 1883. By Lieutenant Carlos G. Calkins, U. S. N.

"SEMPER PARATUS." First Honorable Mention. By Commander N. H. Farquhar, U. S. N.

"CULIBET IN ARTE SUA CREDENDUM EST." Second Honorable Mention. By Captain A. P. Cooke, U. S. N.

1884

The Reconstruction and Increase of the Navy. Prize Essay, 1884. By Ensign W. I. Chambers, U. S. N.

1885

Inducements for Retaining Trained Seamen in the Navy, and Best System of Rewards for Long and Faithful Service. Prize Essay, 1885. By Commander N. H. Farquhar, U. S. N.

1886

What Changes in Organization and Drill Are Necessary to Sail and Fight Effectively Our Warships of Latest Type? "Scire quod nescias." Prize Essay, 1886. By Lieutenant Carlos G. Calkins, U. S. N.

THE RESULT OF ALL NAVAL ADMINISTRATION AND EFFORTS FINDS ITS EXPRESSION IN GOOD ORGANIZATION AND THOROUGH DRILL ON BOARD OF SUITABLE SHIPS. Honorable Mention. By Ensign W. L. Rodgers, U. S. N.

1887

The Naval Brigade: Its Organization, Equipment and Tactics. "In hoc signo vinces." Prize Essay, 1887. By Lieutenant C. T. Hutchins.

1888

Torpedoes. Prize Essay, 1888. By Lieut. Commander W. W. Reisinger, U. S. N.

1891

The Enlistment, Training and Organization of Crews for Our Ships of War. Prize Essay, 1891. By Ensign A. P. Niblack, U. S. N.

DISPOSITION AND EMPLOYMENT OF THE FLEET: SHIP AND SQUADRON DRILL. Honorable Mention, 1891. By Lieutenant R. C. Smith, U. S. N.

1892

Torpedo-boats: Their Organization and Conduct. Prize Essay, 1892. By Wm. Laird Clowes.

1894

The U. S. S. Vesuvius, with Special Reference to Her Pneumatic Battery. Prize Essay, 1894. By Lieut. Commander Seaton Schroeder, U. S. N.

NAVAL REFORM. Honorable Mention, 1894. By Passed Assistant Engineer F. M. Bennett, U. S. N.

1895

Tactical Problems in Naval Warfare. Prize Essay, 1895. By Lieut. Commander Richard Wainwright, U. S. N.

A SUMMARY OF THE SITUATION AND OUTLOOK IN EUROPE. An Introduction to the Study of Coming War. Honorable Mention, 1895. By Richmond Pearson Hobson, Assistant Naval Constructor, U. S. N.

SUGGESTIONS FOR INCREASING THE EFFICIENCY OF OUR NEW SHIPS. Honorable Mention, 1895. By Naval Constructor Wm. J. Baxter, U. S. N.

THE BATTLE OF THE YALU. Honorable Mention, 1895. By Ensign Frank Marble, U. S. N.

1896

The Tactics of Ships in the Line of Battle. Prize Essay, 1896. By Lieutenant A. P. Niblack, U. S. N.

THE ORGANIZATION, TRAINING AND DISCIPLINE OF THE NAVY PERSONNEL AS VIEWED FROM THE SHIP. Honorable Mention, 1896. By Lieutenant Wm. F. Fullam, U. S. N.

NAVAL APPRENTICES, INDUCEMENTS, ENLISTING AND TRAINING. The Seaman Branch of the Navy. Honorable Mention, 1896. By Ensign Ryland D. Tisdale, U. S. N.

THE COMPOSITION OF THE FLEET. Honorable Mention 1896. By Lieutenant John M. Ellicott, U. S. N.

1897

Torpedo-boat Policy. Prize Essay, 1897. By Lieutenant R. C. Smith, U. S. N.

A PROPOSED UNIFORM COURSE OF INSTRUCTION FOR THE NAVAL MILITIA. Honorable Mention, 1897. By H. G. Dohrman, Associate Member, U. S. N. I.

TORPEDOES IN EXERCISE AND BATTLE. Honorable Mention, 1897. By Lieutenant J. M. Ellicott, U. S. N.

1898

Esprit de Corps: A Tract for the Times. Prize Essay, 1898. By Captain Caspar Frederick Goodrich, U. S. N.

OUR NAVAL POWER. Honorable Mention, 1898. By Lieut. Commander Richard Wainwright, U. S. N.

TARGET PRACTICE AND THE TRAINING OF GUN CAPTAINS. Honorable Mention, 1898. By Ensign R. H. Jackson, U. S. N.

1900

Torpedo Craft: Types and Employment. Prize Essay, 1900. By Lieutenant R. H. Jackson, U. S. N.

THE AUTOMOBILE TORPEDO AND ITS USES. Honorable Mention, 1900. By Lieutenant L. H. Chandler, U. S. N.

1901

Naval Administration and Organization. Prize Essay, 1901. By Lieutenant John Hood, U. S. N.

1903

Gunnery in Our Navy. The Causes of Its Inferiority and Their Remedies. Prize Essay, 1903. By Professor Philip R. Alger, U. S. N.

A NAVAL TRAINING POLICY AND SYSTEM. Honorable Mention, 1903. By Lieutenant James H. Reid, U. S. N.

SYSTEMATIC TRAINING OF THE ENLISTED PERSONNEL OF THE NAVY. Honorable Mention, 1903. By Lieutenant C. L. Hussey, U. S. N.

OUR TORPEDO-BOAT FLOTILLA. The Training Needed to Insure Its Efficiency. Honorable Mention, 1903. By Lieutenant E. L. Beach, U. S. N.

1904

The Fleet and Its Personnel. Prize Essay, 1904. By Lieutenant S. P. Fullinwider, U. S. N.

A PLEA FOR A HIGHER PHYSICAL, MORAL AND INTELLECTUAL STANDARD OF THE PERSONNEL FOR THE NAVY. Honorable Mention, 1904. By Medical Inspector Howard E. Ames, U. S. N.

1905

American Naval Policy. Prize, Essay 1905. By Commander Bradley A. Fiske, U. S. N.

THE DEPARTMENT OF THE NAVY. Honorable Mention, 1905. By Rear Admiral Stephen B. Luce, U. S. N.

1906

Promotion by Selection. Prize Essay, 1906. By Commander Hawley O. Rittenhouse, U. S. N.

THE ELEMENTS OF FLEET TACTICS. First Honorable Mention, 1906. By Lieut. Commander A. P. Niblack, U. S. N.

GLEANINGS FROM THE SEA OF JAPAN. Second Honorable Mention, 1906. By Captain Seaton Schroeder, U. S. N.

THE PURCHASE SYSTEM OF THE NAVY. Third Honorable Mention, 1906 By Pay Inspector J. A. Mudd. U. S. N.

1907

Storekeeping at the Navy Yards. Prize Essay, 1907. By Pay Inspector John A. Mudd, U. S. N.

BATTLE REHEARSALS. A Few Thoughts on Our Next Step in Fleet-Gunnery. First Honorable Mention, 1907. By Lieut. Commander Yates Stirling, U. S. N.

THE NAVAL PROFESSION. Second Honorable Mention, 1907. By Commander Bradley A. Fiske, U. S. N.

1908

A Few Hints to the Study of Naval Tactics. Prize Essay, 1908. By Lieutenant W. S. Pye, U. S. N.

THE MONEY FOR THE NAVY. First Honorable Mention, 1908. By Pay Inspector John A. Mudd, U. S. N.

THE NATION'S DEFENCE—THE OFFENSIVE FLEET. How Shall We Prepare It for Battle? Second Honorable Mention, 1908. By Lieut. Commander Yates Stirling, U. S. N.

1909

Some Ideas about Organization on Board Ship. Prize Essay, 1909. By Lieutenant Ernest J. King, U. S. N.

THE NAVY AND COAST DEFENCE. Honorable Mention, 1909. By Commodore W. H. Beehler, U. S. N.

THE REORGANIZATION OF THE NAVAL ESTABLISHMENT. Honorable Mention, 1909. By Pay Inspector J. A. Mudd, U. S. N.

A PLEA FOR PHYSICAL TRAINING IN THE NAVY. Honorable Mention, 1909. By Commander A. P. Niblack, U. S. N.

1910

The Merchant Marine and the Navy. Prize Essay, 1910. By Naval Constructor T. G. Roberts, U. S. N.

THE NAVAL STRATEGY OF THE RUSSO-JAPANESE WAR. Honorable Mention, 1910. By Lieutenant Lyman A. Cotton, U. S. N.

1911

Navy Yard Economy. Prize Essay, 1911. By Paymaster Charles Conard, U. S. N.

NAVAL POWER. Honorable Mention, 1911. By Captain Bradley A. Fiske, U. S. N.

WANTED—FIRST AID. Honorable Mention, 1911. By Commander C. C. Marsh, U. S. N.

1912

Naval Might. Prize Essay, 1912. By Lieutenant Ridgely Hunt, U. S. N. (retired).

INSPECTION DUTY AT THE NAVY YARDS. Honorable Mention, 1912. By Lieut. Commander T. D. Parker, U. S. N.

1913

The Greatest Need of the Atlantic Fleet. Prize Essay, 1913. By Lieut. Commander Harry E. Yarnell, U. S. N.

NAVY DEPARTMENT ORGANIZATION. A Study of Principles. First Honorable Mention, 1913. By Commander Yates Stirling, Jr., U. S. N.

TRAINED INITIATIVE AND UNITY OF ACTION. Second Honorable Mention, 1913. By Lieut. Commander Dudley W. Knox, U. S. N.

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The Great Lesson from Nelson for To-day. Prize Essay, 1914. By Lieut. Commander Dudley W. Knox, U. S. N.

NAVAL POLICY AS IT RELATES TO THE SHORE ESTABLISHMENT AND THE MAINTENANCE OF THE FLEET. Honorable Mention, 1914. By Captain John Hood, U. S. N.

OLD PRINCIPLES AND MODERN APPLICATIONS. Honorable Mention, 1914. By Lieut. Commander Dudley W. Knox, U. S. N.

MILITARY PREPAREDNESS. Honorable Mention, 1914. By Naval Constructor Richard D. Gatewood, U. S. N.

1915

The Rôle of Doctrine in Naval Warfare. Prize Essay, 1915. By Lieut. Commander Dudley W. Knox, U. S. N.

AN AIR FLEET: OUR PRESSING NAVAL WANT. First Honorable Mention, 1915. By Lieut. Commander Thomas Drayton Parker, U. S. N.

TACTICS. Second Honorable Mention, 1915. By Ensign H. H. Frost, U. S. N.

DEFENCE AGAINST SURPRISE TORPEDO ATTACK. Third Honorable Mention, 1915. By Ensign R. T. Merrill, 2d, U. S. N.

1916

The Moral Factor in War. Prize Essay, 1916. By Lieutenant (J. G.) H. H. Frost, U. S. N.

NAVAL PERSONNEL. First Honorable Mention, 1916. By Lieut. Commander J. K. Taussig, U. S. N.

EDUCATION AT THE U S. NAVAL ACADEMY. Second Honorable Mention, 1916. By Lieutenant Ridgely Hunt, U. S. N.

SOME UNDERLYING PRINCIPLES OF MORALE. Third Honorable Mention, 1916. By Commander Dudley W. Knox, U. S. N.

LARGE VS. A GREATER NUMBER OF SMALLER BATTLESHIPS. Lippincott Prize Essay. By Lieut. Commander Thomas Lee Johnson, U. S. N.

1917

Commerce Destroying in War. Prize Essay, 1917. By Commander Lyman A. Cotten, U. S. Navy.

THE PEOPLE'S RÔLE IN WAR. First Honorable Mention, 1917. By Lieutenant H. H. Frost, U. S. Navy.

THE NATION'S GREATEST NEED. Second Honorable Mention, 1917. By Colonel Dion Williams, U. S. Marine Corps.

1918

Letters on Naval Tactics. Prize Essay, 1918. By Lieutenant H. H. Frost, U. S. N.

THE PREPAREDNESS OF THE FUTURE. First Honorable mention, 1918. By Commander H. O. Rittenhouse, U. S. N. Retired.

NAVAL STRATEGY. Second Honorable Mention, 1918. By Rear Admiral Bradley A. Fiske, U. S. N.

1919

MILITARY CHARACTER. First Honorable Mention, 1918. By Captain Reginald R. Belknap, U. S. N.

SOME REFLECTIONS ON THE THREE FACTORS OF BATTLESHIP DESIGN. Second Honorable Mention, 1918. By Lieut. Commander Beirne S. Bullard, C. C., U. S. N.